In Two Sections — Section

The EDISON ELECTRIC INSTITUTE BULLETIN

January
1954

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EEI Resuscitation Awards

Published Monthly by Edison Electric Institute

ELECTRICAL RESEARCH STATISTICS
THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

September, 1952-1953

SOURCE AND DISPOSAL OF ENERGY—MONTH OF SEPTEMBER

	1953	1952	%
GENERATION* (Net)			
By Fuel Burning Plants	29,448,590,000	25,984,788,000	+13.3
By Water Power Plants	7,589,015,000	7,360,893,000	+ 3.1
Total Generation	**37,037,605,000**	**33,345,681,000**	**+11.1**
Add—Net Imports Over International Boundaries	17,365,000	116,405,000	−85.1
Less—Company Use	134,717,000	112,153,000	+20.1
Less—Energy Used by Producer	625,843,000	803,427,000	−22.1
Net Energy for Distribution	**36,294,410,000**	**32,546,506,000**	**+11.5**
Lost and Unaccounted for	3,500,701,000	3,323,014,000	+ 5.3
Sales to Ultimate Customers	**32,793,709,000**	**29,223,492,000**	**+12.2**

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS—As of September 30			
Residential or Domestic	41,635,338	40,340,150	+ 3.2
Rural (Distinct Rural Rates)	1,623,020	1,695,109	− 4.3
Commercial or Industrial:			
Small Light and Power	5,834,859	5,628,666	+ 3.7
Large Light and Power	274,654	259,002	+ 6.0
Other Customers	159,651	157,164	+ 1.6
Total Ultimate Customers	**49,527,522**	**48,080,091**	**+ 3.0**
KILOWATTHOUR SALES—During Month of September			
Residential or Domestic	7,651,035,000	6,818,415,000	+12.2
Rural (Distinct Rural Rates)	1,120,335,000	1,015,628,000	+10.3
Commercial or Industrial:			
Small Light and Power	6,190,610,000	5,502,871,000	+12.5
Large Light and Power	16,343,464,000	14,458,423,000	+13.0
Street and Highway Lighting	309,032,000	287,420,000	+ 7.5
Other Public Authorities	758,892,000	699,146,000	+ 8.5
Railways and Railroads:			
Street and Interurban Railways	209,606,000	229,628,000	− 8.7
Electrified Railroads	159,001,000	168,666,000	− 5.7
Interdepartmental	51,734,000	43,295,000	+19.5
Total to Ultimate Customers	**32,793,709,000**	**29,223,492,000**	**+12.2**
Revenue from Ultimate Customers	**$575,046,500**	**$521,257,100**	**+10.3**

RESIDENTIAL OR DOMESTIC SERVICE

AVERAGE CUSTOMER DATA—For 12 months ended September 30			
Kilowatthours per Customer	2,303	2,131	+ 8.1
Average Annual Bill	$63.56	$59.03	+ 7.7
Revenue per Kilowatthour	2.76¢	2.77¢	− 0.4

* By Courtesy of the Federal Power Commission.

THE EDISON ELECTRIC INSTITUTE BULLETIN is published monthly by the Edison Electric Institute, an association of electric light and power companies in the United States and its territorial possessions. Its affiliate members consist of members of the Canadian Electrical Association.

The objectives of the Edison Electric Institute are:

The advancement in the public service of the art of producing, transmitting, and distributing electricity and the promotion of scientific research in such field.

The ascertainment and making available to the members and the public of factual information, data, and statistics relating to the electric industry.

To aid its operating company members to generate and sell electric energy at the lowest possible price commensurate with safe and adequate service, giving due regard to the interests of consumer, investor, and employee.

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Closing date for the BULLETIN is the tenth of the month preceding the month of issue.

Manuscripts and correspondence relating to the BULLETIN should be addressed to the Editor, Edison Electric Institute, 420 Lexington Avenue, New York 17, N. Y.

The Edison Electric Institute does not assume responsibility for, nor necessarily endorse or approve, statements made by contributors to the BULLETIN.

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Subscription price of the BULLETIN is $2.00 per year in the United States; $3.00 per year in foreign countries.

Entered as second-class matter, August 17, 1933, at the post office at Philadelphia 2, Pa., under the act of March 3, 1879. Publication office, 56th and Chestnut Sts., Philadelphia 39, Pa. Editorial office, 420 Lexington Ave., New York 17, N. Y. Volume 22, No. 1, 1954.

The EDISON ELECTRIC INSTITUTE BULLETIN

January, 1954

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CONVENTIONS AND MEETINGS

1954

JANUARY

14-15 EEI-AGA Depreciation Committee, EEI Headquarters, New York, N. Y.

15 PIP Mid-Atlantic Region Meeting, Atlantic City, N. J.

18-19 EEI Accident Prevention Committee, Hotel Statler, Boston, Mass.

18-22 AIEE Winter General Meeting, New York, N. Y.

18-22 CEA Division Meetings, Quebec, Que.

18-22 National Industrial Electric Heating Conference, Industrial Electrification Council, Netherland Plaza Hotel, Cincinnati, Ohio.

19-20 EEI Residential Promotion Committee, Roosevelt Hotel, Pittsburgh, Pa.

21-22 EEI Industrial Relations Committee Joint Meeting with Personnel Administration Section, Southeastern Exchange and Southwestern Personnel Group, Hotel Roosevelt, New Orleans, La.

FEBRUARY

3 EEI Plant Accounting and Property Records Committee, Netherland Plaza Hotel, Cincinnati, Ohio.

3- 5 EEI Meter and Service Committee, Adolphus Hotel, Dallas, Texas.

4- 5 EEI Home Service Committee, EEI Headquarters, New York, N. Y.

4- 5 EEI-AGA Accounting Conference Planning "Dress Rehearsal," Netherland Plaza Hotel, Cincinnati, Ohio.

4- 5 Missouri Valley Electric Association, Industrial and Commercial Sales Conference, President Hotel, Kansas City, Mo.

4- 5 EEI Commercial Lighting Committee, Washington, D. C.

5 PIP West North Central Region Meeting, Madison, Wis.

9-10 EEI Transmission and Distribution Committee, Hotel Cleveland, Cleveland, Ohio

11-12 PEA Transmission and Distribution Committee, Lord Baltimore Hotel, Baltimore, Md.

11-12 EEI Commercial Cooking and Water Heating Committee, Kellogg Institute, Michigan State College, East Lansing, Mich.

11-12 PUAA Region 5 Meeting, Atlanta, Ga.

15-16 National Association of Purchasing Agents Mid-Winter Conference, Public Utility Buyers' Group, Lord Baltimore Hotel, Baltimore, Md.

15-16 EEI Electrical Equipment Committee, Sheraton Cadillac Hotel, Detroit, Mich.

15-17 EEI Industrial Relations Committee Dinner Meeting in conjunction with AMA Mid-Winter Personnel Meeting, Chicago, Ill.

15-19 ASCE Atlanta Convention, Biltmore Hotel, Atlanta, Ga.

18-19 EEI Commercial Space Heating and Air Conditioning Committee, Tutwiler Hotel, Birmingham, Ala.

19-20 Controllers Institute of America, Southern Conference, Hotel Roosevelt, New Orleans, La.

25-26 PUAA Region 1 Meeting, Montreal, Que.

25-26 PEA Winter Meeting, Electrical Equipment Committee, Hotel Roosevelt, Pittsburgh, Pa.

25-26 10th Annual National Adequate Wiring Conference, LaSalle Hotel, Chicago, Ill.

1954

MARCH

1- 5 CEA Western Division, Winnipeg, Man.

4- 5 PEA Winter Meeting, Relay Committee, Benjamin Franklin Hotel, Philadelphia, Pa.

18 EEI Industrial Relations Committee, EEI Headquarters, New York, N. Y.

21-23 Controllers Institute of America Eastern Conference, Sheraton Park Hotel, Washington, D. C.

22-24 Southeastern Electric Exchange 21st Annual Meeting, Boca Raton Hotel, Boca Raton, Fla.

25-26 Oklahoma Utilities Association Annual Convention, Biltmore Hotel, Oklahoma City, Okla.

APRIL

5- 8 20th Annual EEI Sales Conference, Edgewater Beach Hotel, Chicago, Ill.

7- 8 Pacific Coast Electrical Association, Administration Services Section, Hotel Claremont, Berkeley, Calif.

7- 9 Missouri Valley Electric Association Engineering Conference, President Hotel, Kansas City, Mo.

8- 9 IES Southern Regional Conference, Roosevelt Hotel, New Orleans, La.

11-14 IES Southwestern Regional Conference, Rice Hotel, Houston, Tex.

12-14 EEI-AGA Accounting Conference, Hotel Statler, Boston, Mass.

15 EEI Industrial Relations Committee, Netherland Plaza Hotel, Cincinnati, Ohio

15-16 IES Inter-Mountain Regional Conference, Denver, Colo.

19-20 IES South Pacific Coast Regional Meeting, Museum of Art, San Francisco, Calif.

22-23 IES Pacific Northwest Regional Meeting, Benjamin Franklin Hotel, Seattle, Wash.

28-30 IES Canadian Regional Meeting, King Edward Hotel, Toronto, Ont.

MAY

3- 4 IES Great Lakes Regional Meeting, Sheraton Cadillac Hotel, Detroit, Mich.

3- 5 EEI Purchasing and Stores Committee, Hotel Roosevelt, New York, N. Y.

13-14 PUAA Annual Convention, Hotel Statler, Boston, Mass.

19-21 Pacific Coast Electrical Association Annual Convention, Hotel Del Coronado, Coronado, Calif.

JUNE

1- 4 EEI ANNUAL CONVENTION, Atlantic City, N. J.

3- 5 Controllers Institute of America Western Conference. Empress Hotel, Victoria, B. C.

14-19 ASCE Convention, Chalfonte Haddon Hall, Atlantic City, N. J.

17-19 IES Midwestern Regional Meeting, Hotel Jefferson, St. Louis, Mo.

24-26 CEA Annual Convention, Murray Bay, Quebec, Que.

27-30 Michigan Electrical Association Annual Convention, Grand Hotel, Mackinac Island, Mich.

The EDISON ELECTRIC INSTITUTE
BULLETIN

The Electric Industry in 1953

Walter H. Sammis
President, Edison Electric Institute

THE extraordinary postwar growth and service record of the electric industry was continued in 1953 with noteworthy gains over the preceding year.

Particularly outstanding was the high level of electricity output and revenue recorded for the year. Construction expenditures of the investor-owned companies set a new record. Likewise, financing by the companies for the building program made an all-time record, with the sales of common stock the greatest of any year. New power generating installations by the electric industry in 1953 were also the greatest for any year.

Private Business Threatened

Perhaps the most important problem that confronts the investor-owned electric utility industry today is the inroad that government proprietary operations are making in our business. Government proprietary business is a threat to all private enterprise. When government goes into proprietary business, it pays no Federal taxes and makes little, if any, payments in lieu of state or local taxes, and in most cases no interest on the capital employed is charged against the government proprietary operation.

If the government with the tax monies of the citizens is going to compete with them in business, government proprietary business should be operated on an equal basis with private proprietary business, charging to government business the true costs of doing business. Government should not base its business prices on subsidized costs at the expense of the customers of private business and the general taxpayer.

Total generation of electricity in the U. S. passed the half-trillion kwhr mark in 1953. Production by the entire electric industry (companies, cooperatives, and governmental agencies) reached 442,000,000,000 kwhr, an increase of 43,000,000,000 kwhr over the preceding year. Production by industrial and railway plants was 71,000,000,000 kwhr, bringing the grand total to 513,000,000,000 kwhr.

One million four hundred thousand new customers were added by all components of the electric industry in 1953, bringing the total to 49,900,000 taking service at the end of the year. Nearly 16,000,000 new customers have been added by the industry in the past eight years. Since electricity is now in reach of nearly every American home, with about 98 per cent of occupied homes, both urban and rural, enjoying electric service, the growth in customers during the year was due largely to construction of new homes to take care of population increase.

The continually expanding use of electricity in the home was emphasized by the greatest increase on record in the average annual use by the householder. The increase was 186 kwhr during the year, and the total average consumption for 1953 was 2355 kwhr, an amount more than double the average use nine years ago.

In addition to lighting, more than half of American households now use nine electrical appliances—radios, irons, refrigerators, clocks, washers, toasters, vacuum cleaners, coffee makers, and television. Phenomenal increases have also been made since the war in the use of such heavy-duty appliances as ranges, water heaters, freezers, and dryers.

Despite continuing inflationary factors, the average revenue per kilowatthour sold to domestic customers held its own, dropping from 2.77 cents in 1952 to 2.75 cents in 1953, indicating the possibility of a leveling off of the industry's historic downward price curve for electricity for residential use.

Effects of Inflation

Starting at 24 cents per kilowatthour in 1882, the average price to domestic customers was 10.5 cents in 1907, 25 years later; down to 5.6 cents in 1932; and to 4 cents in 1939. Earlier declines resulted largely from technical advances in electricity supply and in more recent years from further refinements in equipment and operational improvements, increases in efficiency of new plants, and the constantly expanding average consumption of electricity by the domestic consumer.

Postwar inflation, in many cases doubling the cost of elements entering into the production of electricity (labor, construction materials, generating and distribution facilities, fuels, etc.), has progressively offset the conditions that made electricity's unique price history possible.

Regulatory commissions are continuing to recognize the inroads of

inflation, as evidenced by the granting of rate adjustments required to insure the financial strength necessary for the continuance of adequate electric service to the nation.

Four hundred applications for rate increases were made by the electric companies from 1946 through the first 11 months of 1953, according to tabulations of the Edison Electric Institute. Of this number, 351 applications were granted, 28 are pending action, 11 were withdrawn, and ten denied.

The 1953 record alone shows 56 actions by the commissions. Applications granted were 35, pending are 15, and 6 were withdrawn or denied.

By the end of 1953, an estimated 5,010,000 farms had electric service, 93 per cent of the over-all farm figure. All but 2 per cent of the nation's occupied farms now either have electric service or have it readily available. Until recently, the primary concern in farm electrification was the extension of power lines to the farmer. Now, however, with nearly every farm having electricity at hand, the emphasis has shifted to the study and development of techniques and equipment to enable the farmer to make increasingly profitable use of his electric service.

Electricity Sales

Electricity sales by the electric industry in 1953 totaled 382,000,000,000 kwhr, an increase of 39,000,000,000 kwhr over 1952, or 11.5 per cent. The kilowatthour increase in sales was greater than in any preceding year. Sales were double that of 1946, the first year after the end of World War II. Sales to industrial customers totaled 189,500,000,000 kwhr, a 13.2 per cent increase over 1952; residential sales were 96,800,000,000 kwhr, an 11.5 per cent increase; and to commercial customers, 68,200,000,000 kwhr, a 9.9 per cent increase. Sales to other customer categories totaled 27,500,000,000 kwhr.

With the relaxation of material controls in late spring, the industry's postwar construction program got under full headway, making possible a record installation of 9,200,000 kw of generating capability during the year. Of this total, 6,900,000 kw was installed by the investor-owned companies and the remainder by cooperatives and governmental agencies. These installations brought the total installed generating capability of the industry at the end of 1953 to approximately 93,500,000 kw, or about double that of 1942.

For the country as a whole the gross margin between generating capability and peak power demand in 1953 was 13,500,000 kw or 17 per cent, as compared with 8,850,000 kw or 12 per cent in 1952. Growth in December peak demand was 6 per cent, as compared with 7 per cent in 1952 and 9 per cent in 1951.

An adequate supply of power was maintained in all sections of the country, including the Pacific Northwest and the Tennessee Valley area, sections where drought conditions during the past few years had resulted in some curtailment.

Construction

Total scheduled construction for the entire electric industry in 1954 is 14,100,000 kw of generating capability, of which 9,431,000 kw is planned by the investor-owned companies. The addition of this amount to present capability will bring total installations to 107,600,000 kw of generating capability, of which approximately one-half will have been added since 1947.

Expenditures during 1953 for construction by the investor-owned companies totaled $2,850,000,000 as compared with $2,599,000,000 in 1952. The 1954 construction budget is $3,000,000,000. Construction expenditures of the electric companies from the end of World War II to the end of 1953 totaled $16,000,000,000.

Money obtained to finance the year's construction program of the electric companies totaled $2,850,000,000. Nearly $2,000,000,000 of the 1953 total was obtained from the sales of securities and the remainder, $910,000,000, was drawn from depreciation reserves and surplus accruals. Bond sales in 1953 totaled $1,200,000,000, common stock $525,000,000, and preferred $215,000,000. The total of sales of common stock exceeded that of 1952 by 25 per cent and was only slightly less than the combined sales of common during the four years 1946-1949 inclusive.

Investment in plant and property of the electric companies was approximately $25,500,000,000 at the end of 1953 as compared with $12,500,000,000 in 1945.

Gross revenues of the investor-owned electric companies were $5,940,000,000 in 1953, an increase of 9.5 per cent, or slightly more than $500,000,000 over 1952, and more than double gross revenues in 1944. Net income of the companies was $1,045,000,000, an increase of 9 per cent over 1952. Net income was also double that of 1944.

Biggest Expense Items

For the fourth straight year taxes have been the biggest item of the electric companies' expenses. In 1953 taxes, Federal, state, and local, consumed $1,338,000,000 of electric operations revenues, a 9.3 per cent increase over 1952. Federal taxes were $830,000,000 and state and local, $508,000,000.

Wages and salaries totaled $1,157,000,000 in 1953, an increase of 6.6 per cent over the preceding year. Fuel, the third highest item, was $1,025,000,000, up 11.5 per cent over 1952.

The relatively high increase in the fuel bill was due to a 13.8 per cent increase in kilowatthours generated by fuel, as compared with a 2.3 increase for hydro, and a 12 cent per ton average increase in the cost of coal.

Increasing efficiency in fuel-burning stations brought downward the coal consumption per kilowatthour generated from an average of 1.097 lb per kilowatthour in 1952 to 1.065 lb in 1953. Ten years earlier the comparative figure was 1.297 lb per kilowatthour. On the basis of comparison with the 1943 figure, a saving was made this year of some 39,000,000 tons of coal, equal to $250,000,000 in value at prevailing 1953 coal prices.

New EEI Publication

What Electric Companies Are Doing in Farm Betterment Programs

EEI Pub. No. 53-15. Compiled by the EEI Agricultural Development Committee. 88 pages. Price: $1.00.

This report summarizes recent and continuing activities of 54 electric companies serving farm areas throughout the nation. These activities are listed under the headings of agricultural development, youth activities, and utilization of electricity; 434 separate activities and results obtained are also listed.

The Outlook for Power—
A Look Beyond the Statistics

Elmer L. Lindseth

President, The Cleveland Electric Illuminating Company

An address before the Great Lakes Security Analysts Conference, Cleveland, Ohio, October 13, 1953

I SPEAK at a time when there is unusual interest in the electric industry and plenty of reason for that interest. This is a vital and growing industry. It is big, but it is going to get much bigger. You people here are analysts. You and I have seen a great many statistics on the long-range growth and earnings outlook for power. And we know that the outlook is good.

Revenues in the electric industry, the forecasts say, will double in the next ten years, from $6,500,000,000 this year to $13,000,000,000 by 1963. This growth can be accomplished, I think, with only modest increases in the selling price per kilowatthour of energy.

This prospect of rapid expansion in sales will require us to double our capacity by 1963. Over the next ten years, the industry, both public and private, will spend some 50,000,000,000 1953-dollars for power system facilities. That's just about twice the amount spent in the past decade—a decade in which we've been expanding at the fastest rate in our entire history. We are going to need and utilize this expansion because utility output, which doubled in the past ten years, is going to do so again in the next ten.

Outlook for Power Enormous

I do not foresee major difficulties in financing the new facilities required to supply these mammoth power needs of the nation. I think the rates charged will be low enough and the sales efforts good enough and the cost controls effective enough to support and justify the investment in the required expansion. Yes, the outlook for power is big—enormous.

As we look at these prospects for power today, we find an unusual interest in the industry because of a large number of recent developments. Let's briefly mention some of them.

Speaking for the administration recently, Secretary McKay issued a statement of Federal Power Policy which offers a basis for revising the Federal program of attempting to socialize the electric industry.

The United States Supreme Court has upheld the right of the Federal Power Commission to grant a license to the Virginia Electric and Power Co. for hydroelectric development at Roanoke Rapids, N. C., a development previously bitterly contested by the Interior Department.

There is legislation pending on the Niagara Redevelopment which is of the greatest importance to the future of America. Strong forces are seeking to put Federal and state governments into the power business where there is no issue of navigation, irrigation, or flood control. The Niagara legislation can go a long way toward resolving principles.

At Hell's Canyon, the government wants to build the world's highest dam at a cost of roughly $400,000,000, although this is three times the cost of the alternative project which the Idaho Power Co. proposes to build with private capital, not tax dollars. Here, too, more basic principles will be resolved. In addition, the fundamental concept behind the vast TVA operation is up for some searching re-examination.

There is much talk and speculation, responsible and otherwise, about atomic energy and its consequences and impact on electric companies.

There is a growing understanding of the effect on electric companies of the loss in value of the dollar and the necessity for so-called economic depreciation. The realization is beginning to grow that the original cost basis for depreciation allowance is scarcely adequate. The impact is great here on both income taxes and rates. There is also increased recognition by the courts, commissions and National Association of Railroad and Utilities Commissioners of the importance of fair value and reproduction cost in the determination of the allowed rate base.

Electric companies are generally in the midst of the largest construction and financing programs in their history. Utility stocks are in considerable favor with investors, especially institutions and pension funds, as defensive investments.

There is widespread expectation of a short-term down turn in the present high level of business generally and a belief that it will affect electric companies in varying degrees. It is recognized among analysts and investors that some utilities will be affected differently from others.

Considerable interest has been generated in the Wilson Plan for the sale of government-owned power facilities to private investors. Interest is growing in getting the government out of business generally. Herbert Hoover in a statement of great significance has proposed taking the Federal government out of its competitive role in the power picture entirely.

There is need in the near future for many electric companies to obtain rate increases. Some of these applications may come at a time when business is temporarily on the down grade and customers may be unreceptive because of cuts in personal income and declines in profits generally.

Competition from natural gas for the range, water-heater, and clothes-dryer markets is becoming intensified with the growing availability of natural gas.

Need for Spreading Taxes

There is a growing realization of the need for spreading the tax burden, which now falls so heavily on investor-owned electric companies, equally to governmentally owned and other tax-exempt suppliers of power.

The FPC has under consideration an accounting rule for companies subject to its accounting jurisdiction under which tax postponement arising from accelerated amortization is to be taken into income. This, of course, would falsely increase stated

profits and would certainly override the intent of Congress in providing incentive for electric companies to construct added facilities.

There is prospect of a reduction, however slight, in the corporate income tax rate as of April 1, 1954.

Yes, there are many interesting current developments bearing on the outlook for power, and, as I have said, the outlook for the electric industry is virtually as big as we in the business make it. But I want to emphasize that there is nothing automatic about this future; to achieve it will take all the brains and skill and determination that we can muster.

Analysts' Tools

Mathematics and statistics are the tools which you analysts constantly use. They are good tools. Being an engineer, I use these tools myself. I have a wholesome regard for them. Mathematical and statistical forecasts of our growth, short and long term, you all have. You know about our construction programs, our financing needs, and our technological improvements now in progress. Yes, you have a bale of arithmetic about our outlook. And it is both useful and necessary.

But I submit the thesis that there are many facets of the outlook for power and especially the outlook for one power company as compared with another that do not lend themselves easily to statistical analysis. And yet they deserve the attention of you analysts—more attention, I think, than they customarily get.

In order not to duplicate the material you already have, I'll forego discussing the statistical outlook for power and devote my time to the subject of these nonquantitative aspects. I'd like to raise some questions which you yourselves might in turn raise in appraising the prospects of one electric company as against another, or in appraising our whole industry as against some other industry.

In the course of realizing the enormous future I see for our industry, the road will be beset with many problems—serious problems. But no matter how difficult these problems may seem, there are few, if any, that human brains cannot lick. So, of all the problems to be found in analyzing the outlook for power, the major one confronting the industry is to get these brains and to develop, motivate, and utilize them.

How is the industry—or the particular company we are examining—fixed for manpower? What are the means employed to insure good recruitment and selection of new manpower, old and young? How well does the particular company handle the appraisal and development of its executives, present and prospective?

How are the educational and development programs within the company? How well is it practicing rotation of assignment for broadening its people and getting new viewpoints at work on its old problems? How well does it recognize management as a competence separate from technical or professional competence? How actively do its people participate in management, professional, technical, and industry associations?

How well is it utilizing opportunities for development outside the company? How many of its people does it send to advanced programs at the universities, for example? How well does the particular company utilize the opportunities of developing its people through community and civic activities? Here lies both an opportunity and an obligation. How does the particular company measure up?

These are only a few of the numerous questions one needs answers to in the field of people, and there are many more—important ones. But it's a good starting point. Efforts and results vary widely among companies. Some companies do better than others. And it's well to know which ones these are.

Organization and Depth

Given the people, then, how does the particular company's plan of organization look? And its organization planning activities? Does the company recognize the need for formal and continuous organization study and planning? Who is responsible for it? How well thought out are the company's manning tables and replacement needs?

How does it look in regard to control? How is it for depth, layering? How long—or short—is the chain of command from top to bottom? How well is it practicing decentralization and delegation of authority and responsibility? Is the organization one with many jobs crutched up with one-over-one assistants and assistants-to? How clean cut is it?

How does it look in regard to the grouping of like functions? In overlap? In under-lap? Is it a one-man operation? Individuals, especially indispensable ones, have a way of disappearing from the scene. Is its organization dynamic and fluid? How much has the form or plan of organization changed in recent years? One or five or ten?

How is the company fixed for staff? Is there clear understanding of the functions and relationships between line and staff?

Sound Salary Administration

Given a planned organization and people to man it, there comes the important matter of motivation. How does the particular company which we are examining measure up? How good is the company's salary structure? Does it pay adequate salaries to enable it to compel good performance of top executives?

Are top salaries sufficient in their motivation to those in lower and middle levels aspiring to them? Is the top salary high enough? How about the second and third and fifth and fiftieth? Is the company, as evidenced by its salary structure, a one-man outfit or a highly motivated team?

How systematic is its plan of management salary review? Does it have a sound plan of salary administration at least as good in principle as its hourly and weekly job evaluation plan? How about bonuses and extra compensation? Is there a workable plan for above-normal performance?

How about nonsalary compensation such as insurance, deferred compensation, and pensions? Is the company's pension plan adequate by modern standards? How about the ceiling? Is it high enough by comparison with other industries? How about the company's pension plan liability for past service? Is it fully funded or, if not, are there sound plans for getting it funded? Or is this a load for investors of the future to carry?

How about the investment of its pension funds? Are they trusteed in modern fashion with an enlightened investment policy to provide maximum yield with requisite security? A small increment in yield makes an important difference in annual cost to the company or benefit to the individual. And does the pension fund own a sound amount of common stocks

(*Continued on page* 20)

To Those Who Carry On

N. Bernard Gussett
President, Iowa Power and Light Company

An address before the Westinghouse Power Supplier Conference, Chicago, Ill., December 2, 1953

ALMOST 30 years ago I was invited to take an interest in farm electrification. The invitation was extended by my boss and, as I recollect, it was not engraved. In fact, it was not even printed. To be exact, it consisted of the verbal information that 15 Texas cotton farmers wanted lights in their houses, that lights promised no better than minimum bills, that the five miles of required line could not be justified on the basis of minimum bills, and I was asked when I figured on justifying the extension and starting construction. I said soon, because that year was no 1953 as far as the shortage of young engineers was concerned, and I somehow got the impression that if the line was not justified and built that the company might find it possible to get along without my services.

Face to Face With Realities

That initial project brought me face to face with the following:

1. Spans of 150 ft gave the impression out in the country of a picket fence of poles.
2. Forty-five-ft poles looked a little tall.
3. Urban class poles seemed a bit heavy.
4. Insulation on wires looked superfluous.
5. A voltage of 2300 appeared inadequate for long rural runs.
6. Something had to be done to prove to the farmer that he needed more than home lighting; something had to be done to show the farmer that he could save money and make money by farm electrification extending far beyond house lighting.

Today it may seem fantastic that anyone would even consider the extension of urban construction designs into rural areas. However, let me say to the young people that if they are called upon 30 years from today to comment upon some of their earlier actions, they may find it a good salve of conscience to admit that backsight is a lot easier than foresight but certainly less efficient.

The construction details of a proper rural line as distinguished from an urban feeder seem relatively simple to work out. In fact, even on our little initial job we extended spans, cut down pole heights, reduced pole class, abandoned long, six-pin wood crossarms, and went to a bare conductor with improved tensile strength. However, lest you get the impression that in one fell swoop we solved all the problems of rural construction, let me say that in the interest of minimum investment we not only stayed with 2300-v single-phase but also cut down the size of the conductor to the point where a single pump jack caused the voltage to swing up and down in a manner most disconcerting to the rural customers.

That single pump jack plus some yard and barn lighting plus some ranges and water heaters had to be added because we were determined to sell that job to management on the basis of some reasonable relation between investment and estimated annual gross revenue.

It had somehow sold itself to us, had lighted a fire of enthusiasm and had established a belief that here was a job that should be done and could be done, not alone for 15 Texas cotton farmers but for rural dwellers throughout our service area.

That job was sold, and many, many jobs like it were sold to farmers and to management until a saturation of practicable connections was reached.

As I remember it now, there was the suggestion of a smile on the face of the boss the day he approved that first rural line. I did not notice it at the time because I was too busy keeping my own face wreathed in smiles and in exerting my very best sales effort.

I appreciate now that he knew full well that my justification was on the thin side but that he too believed in the future of rural electrification. In the years that followed, he demonstrated it time and time again, and on more than one occasion I found that my willingness to lead the parade was assisted no end by a good sound push from behind by management.

One of these pushes was in the form of a suggestion that areas might be electrified by the mass construction procedure and that great economies might be made thereby. It seemed radical then, but within a week I had taken the idea as my own and was so advising all who would stand still and listen. Somehow, the boss did not seem to mind. I guess the poor old soul just did not care who got the credit so long as the job got done.

Another of his suggestions, based, I thought, on not too good an understanding of rural electrification, was to the effect that maybe we could build up revenue and justify more and better lines if we spent more time on finding new and profitable uses for electricity on the farm.

Maybe I did not spend enough time on that one. In fact, no one did and no one has. I make that statement in full appreciation of the committees and the bureaus and the associations and the colleges and the individuals that have prepared studies and booklets and papers on rural load building which would stretch from here to the moon.

Maximum Utilization Unapproached

However, we simply have not seen anything yet. The point of maximum utilization of electricity on the farm has not even been approached. Progress has been made as is evidenced by the increasing annual use per farm customer, but the gaining of the goal lies, first, in a better imagination and, second, in technological advances of the future which are entirely unknown to us today. They remain to be made.

Farming is no longer a back breaking pursuit engaged in by the dullard. Today it is a technical industry, the successful pursuit of which requires

much high level know-how. New fertile acres are not being made and, in fact, many are being taken out of production by the needs of a growing population for defense, for water, for living space, for highways, for recreation.

Those that remain must be utilized to better and better advantage by men and women who spend less and less time in turning the furrows and more and more time in turning the leaves of books and in putting into practice on the land the things they learn from books.

I think that a step in the right direction has been taken by Westinghouse in sponsoring the 4-H Farm and Home Electric Program. I believe it will help to develop our fine young farm men and women so that they can carry on where we must necessarily leave off. It is a program which deserves the help of all of us and particularly of the power suppliers.

Farming as a Career

These young men and women are about to take important places in our economy. It is up to them to carry on. I hope that they will see fit to stay in the farming business. It is a good business and it offers promise of a fine productive life to those who elect to follow it.

It is a business which will be subject to more changes and improvements in a foreseeable span of years than it has known since the dawn of history. It is a business which will require experts with know-how to run it. I think we have in our young farm men and women of today those who are well on their way to becoming experts.

It is our job as power suppliers to continue to study and to help solve the problems of rural electrification in order that we can do our bit toward convincing these young people that farming does offer a career whose rewards are at least as great and whose way of life is much superior to that of the city dweller.

Failure to sell that idea, failure to convince the young farm men and women of today that they should select farming as their life work, can have serious consequences. It could contribute substantially to our defeat in the coming trade war for economic survival.

We may suffer from an H-bomb tomorrow, but I do not think we shall. In our civil defense procedures we must assume the worst, and cannot assume less, but it is my personal opinion (original by no means) that our enemies think they can accomplish our downfall by means less hazardous to themselves.

Sharing Our Treasures

Their leaders have said that we can be forced to spend ourselves into ruin. They know full well that with a huge national debt we are not in the best position either to fight a long war or a long recession. What is more important, they appreciate that nations friendly to us, unknowingly and, in fact, with substantial aid from us, may eventually exert pressure on us in the world market. Let us not sell short the industrial or the agricultural ability of the Germans, the French, the Italians, the Greeks, the British, the Japanese and others. Particularly, we must not assume that they are not apt students of things scientific.

It is unnecessary to say that we cannot build a wall about our borders. Furthermore, the avenues of approach to our fertile land are so wide and high and short that no barriers against them can be built.

With such open avenues, we must admit that we must be prepared to share our treasures in know-how and resources with those less happily endowed. However, in the sharing, we want, first, to continue to live, second, to continue to live in our American way, and, third, to increase and not diminish our standard of living.

I think that we can live and live free and live better in this troubled world until that happy day, admittedly a long time in the future, when all men live for mankind and not against mankind. How?

Our Scientific Culture

I believe that these desirable ends can be achieved if we realize first, that we are now in a scientific culture, second, that we probably are better fitted than any other nation to use that culture and, third, that we cannot use it and survive on a philosophy of leisure.

Now, first, as to the scientific culture. It would gain us little to repeat how many more automobiles or telephones or TV sets or electric refrigerators we have than the Mau Mau's in Africa. Certainly we have them, but, in effect, our possessions must be averaged with those of all mankind. We are lengthening and strengthening the arms of American men and women by industrial know-how and by its application to the tools of production and the tools of living. At the same time, we are lengthening and strengthening the arms of those who oppose us. Know-how is no secret. The atomic bomb is no secret and, in my opinion, never was. I am not naive enough to believe that the Germans might not have beat us to the A-bomb had they possessed the industrial resources.

As to our being better fitted than any other nation to live in this scientific culture, we stand in front because our general level of education has been at so high a level, relatively speaking, that the minds of our people have been able to transform their dreams via formula and thought process to machines and procedures and results. There is no reason why we cannot and will not continue to proceed along these lines. However, since we are now in an increasing world competition for physical and industrial survival, I think that we must recognize the competition and must appreciate that the scientific training of our youth must be accelerated, with great stress laid upon the technical training of the young men and women who have selected farming as a career.

The Dignity of Work

Finally, as to my statement that we cannot meet world competition and maintain a philosophy of leisure, I think we should cease to over-emphasize to our young people the benefits of leisure and that we should begin again to preach the doctrine of the dignity of work. I believe the time has come to tell them to be prepared to get out and work and work hard if they expect to get rewards and to live happy and full and long lives.

It seems to me that nowhere else in our economy is there a plan of living which offers so great a promise as the farm of tomorrow, that nowhere else is there so ideal an opportunity for productive work, physical and mental, and adequate rewards. Let us hope that today's young farm men and women and generations after them will see it in that light, for therein lies a must if this way of life we live and love is to continue through the centuries, as it should, for the eternal benefit of mankind.

Electric Companies and Manufacturers Plan Jubilee Observances Throughout Country

COMMUNITY observances of Light's Diamond Jubilee, commemorating 75 years of electrical progress since Edison's invention of the first practical incandescent lamp, are being planned by electric companies and manufacturers in over 600 towns and cities throughout the country. This was revealed recently by Charles E. Wilson, Chairman of the Jubilee Sponsoring Committee, who said that this figure was expected to rise to some 750 within the next few months.

To date, a total of 149 electric companies have scheduled local ceremonies. These companies serve 34,000,000 customers, 86 per cent of all the customers served by the investor-owned electric industry.

Mr. Wilson also announced the names of 36 Jubilee Sponsoring Committee members listed in the adjoining box. Among them are former President Herbert Hoover, long-time friend of Edison; Charles Edison, son of the inventor and Chairman of Thomas A. Edison, Inc.; Harvey S. Firestone, Jr., son of Edison's great friend and Chairman of Firestone Rubber Co.; and Henry Ford II, President of Ford Motor Co. and grandson of the automobile pioneer who assembled a priceless collection of Edisonia at Greenfield Village.

Miami's Orange Bowl Parade on New Year's Eve will be the initial Jubilee event of the coming year. Through the auspices of Florida Power & Light Co., many of the parade floats will feature a Jubilee theme. Illumination will be stressed throughout the procession, and some of the nation's outstanding lighting engineers are working to make this one of the most brilliantly lighted parades ever staged.

The parade will have a nationwide audience in that it will be picked up by CBS Television's New Year's Eve show on December 31 from 7:00 to 7:30, EST. The Orange Bowl Committee is also planning production of a color film to record the parade, other Orange Bowl festivities, and a spectacular display being arranged through the efforts of Florida Power & Light and General Electric Co.

The display will be set up on two ocean-going barges anchored in Biscayne Bay at the foot of Miami's Flagler Street. A huge figure of King Orange will be mounted on one barge and on the other a gigantic birthday cake with 75 candles on it. "Light's Diamond Jubilee" will be spelled out in lights across both barges, with a revolving diamond replica mounted above. A fountain and water curtain will play in front of the barges to add color. Altogether, some 60 kw of lighting will be used in the display, and these will be supplemented by floodlights from the shore.

Florida Power & Light is also cooperating with the Edison Pageant of Light, held annually at Ft. Meyers, Fla. The festival will be climaxed on February 13 with a grand parade of light and a stadium presentation.

Representative of other local electric company celebrations being planned are the following:

Central Vermont Public Service Corp. will observe its twenty-fifth anniversary and Light's Diamond Jubilee together at Rutland and other cities in the company's service area. West Penn Power Co. will employ the Jubilee theme in opening a 135,000-kw addition to its Springdale station. Through Montana Power Co., the city

Jubilee Sponsoring Committee Members

J. B. Black, Pacific Gas and Electric Co.

George H. Blake, Public Service Electric and Gas Co.

Prentiss M. Brown, The Detroit Edison Co.

D. B. Clayton, National Electrical Contractors Association.

Ralph J. Cordiner, General Electric Co.

Cleo F. Craig, American Telephone & Telegraph Co.

C. P. Crane, Electric Companies Advertising Program.

Edgar H. Dixon, Middle South Utilities, Inc.

Charles Edison, Thomas A. Edison, Inc.

B. L. England, Atlantic City Electric Co.

Harvey S. Firestone, Jr., Firestone Rubber Co.

Henry Ford, II, Ford Motor Co.

Willis Gale, Commonwealth Edison Co.

R. E. Ginna, Electric Companies Public Information Program.

Herbert Hoover, former President of the United States.

J. H. Jewell, National Electrical Manufacturers Association.

E. L. Lindseth, The Cleveland Electric Illuminating Co.

H. P. Liversidge, Philadelphia Electric Co.

Walter P. Marshall, Western Union Telegraph Co.

J. W. McAfee, Union Electric Co. of Missouri.

C. B. McManus, The Southern Co., Inc.

Don G. Mitchell, Sylvania Electric Products, Inc.

I. L. Moore, New England Electric System.

W. C. Mullendore, Southern California Edison Co.

William S. Paley, Columbia Broadcasting System.

Gwilym A. Price, Westinghouse Electric Corp.

W. A. Roberts, Allis-Chalmers Manufacturing Co.

Walter H. Sammis, Edison Electric Institute.

David Sarnoff, Radio Corporation of America.

H. R. Searing, Consolidated Edison Co. of New York, Inc.

Philip Sporn, American Gas and Electric Service Corp.

Frank M. Tait, The Dayton Power and Light Co.

E. S. Thompson, The West Penn Electric Co. (Inc.)

G. W. VanDerzee, Association of Edison Illuminating Companies.

Thomas J. Watson, International Business Machines Corp.

J. R. Whiting, Consumers Power Co.

of Butte, incorporated the same year that Edison invented the lamp, will conduct its anniversary in conjunction with the Jubilee.

In its home city, Indianapolis Power & Light Co. will begin its Jubilee celebrations with a presentation to the Electric League of Indianapolis on February 11. In Sunbury, Pa., where the first Edison 3-wire system was placed in operation in 1883, Pennsylvania Power & Light Co. will also conduct a Jubilee presentation.

A number of electrical manufacturers and other major industrial firms have expressed interest in Jubilee participation. Several have already indicated that they will use the Jubilee emblem in their advertising and promotional activities throughout the year.

The Jubilee theme will receive emphasis in several exhibits in coming months. On January 11-15 the Jubilee will be featured at the annual Pennsylvania State Farm Show in an extensive electrical exhibit sponsored by the Pennsylvania Electric Association. The centerpiece of the display will present the Jubilee emblem and theme in a striking arrangement designed to attract the attention of the farm show's thousands of visitors.

"Industrial Progress USA," a traveling exhibit of the Henry Ford Museum, will be shown from Louisiana to Michigan in the next six months. Among the exhibit's 20 separate displays are ones dealing with the history of illumination, electric power stations, home laundry appliances, home entertainment, and electric automotive equipment, all of which have bearing on the Jubilee. The exhibit has been successfully sponsored locally by utilities, banks, department stores, and chambers of commerce.

In addition, London Films' new production, "Gilbert and Sullivan," shows the inauguration of electric theatre lighting at the premiere of "Iolanthe" at London's Savoy Theatre in 1881. Manager D'Oyly Carte is pictured demonstrating that an electric bulb can be broken without danger of fire. He then turns on new electric lights, making the theatre's gas jets pale by comparison.

In the field of publicity, Pennsylvania Power & Light received wide service-area coverage with a release based upon announcement of the Jubilee. West Penn Power used last year's anniversary of the invention of the lamp to good advantage as a peg for a similar announcement. Other Jubilee publicity has appeared in various electric company and association publications, such as *Front Line* (Iowa Electric Light & Power Co.), *Central Hudson Bulletin*, *Ohio Edisonian*, *Monongahela News*, *Electric Meter* (Atlantic City Electric Co.), and *Utilitarian* (Wisconsin Utilities Association).

Jubilee stories have also appeared in national trade journals. *Electrical World* devoted an editorial to the Jubilee in its October 5 issue, and on October 9 *Retailing Daily* carried a Jubilee story directed especially toward appliance dealers.

A variety of Jubilee material is available from specialty manufacturers. Hartwig Displays has developed a group of window and floor displays based on the Jubilee theme for use by electric companies. Illustration Services, Inc., is making available special-purpose picture booklets in comic-book format tailored to specific company requirements. Perdeco Displays has developed two Jubilee display pieces, one featuring Edison, the other the first lamp. Both are in relief, indirectly illuminated, and seven feet in diameter.

Robbins Co. is preparing key tags of the Jubilee emblem, with beaded chains, and also lapel buttons, tie bars, and other Jubilee souvenir jewelry. Rushford Collections is offering displays on lighting development, each containing from 20 to 250 historical lamps. The rental fee is dependent upon display size and length of use. In addition, Bishop Publishing Co. is developing three-dimensional plastic and cardboard display material based upon the Jubilee emblem and slogan.

Excellent background material for the Jubilee is contained in "The Electric Era Dawns Upon America," a Newcomen Society address by EEI Managing Director H. S. Bennion. Single copies may be obtained free of charge from the Institute.

The present status of Jubilee planning was detailed in the second *Jubilee Newsletter*, recently forwarded to interested individuals and organizations. The Jubilee plan book, now being prepared, will probably appear later this month.

Inquiries concerning the Jubilee may be directed to Prall Culviner, Light's Diamond Jubilee Secretary and Coordinator, Room 2650, 420 Lexington Ave., New York 17, N. Y.

I Want to Know About the Electric Industry Now Available in its Sixth Annual Edition

THE 1953-1954 edition of *I Want to Know About the Electric Industry*, an information booklet said to be of unusual concept and form for an industry fact-book, has just been published by the Edison Electric Institute.

Subtitled "the answers to 28 questions frequently asked the Institute," the booklet consists primarily of single page presentations of each question, with a brief answer and tabular and explanatory material for a more extended answer to the question posed. In most cases basic data are given in historically comparative form, and the answers to the questions, collectively, provide a short, comprehensive story of electric industry operations, progress, and relationship to the national economy.

The material in the booklet is industrywide in scope. Most of the basic national data is derived from EEI's annual *Statistical Bulletin* and from various publications of the Federal Power Commission. The booklet answers questions dealing not only with such far-reaching matters as "How does the United States rank in world production of electricity?" and "How fast is it moving in production and generating capacity?" but with more immediate topics such as "Who uses how much?" "What about electricity at home?" "Who owns the electric industry?" "Who produces and sells the greatest percentage of electricity?"

In addition to general coverage of industrial, commercial, farm, and home use of electric power, such subjects as revenues and expenses, fuel consumption, steam plant and water power installations, and trends in the ownership of generating installations are also discussed.

Originally conceived to fill a need for an accurate, concise presentation of facts and figures concerning one of the nation's most vital industries, and now in its sixth annual edition, "I Want to Know" has found wide demand within and outside the industry.

System Planning and Development at Houston Lighting & Power Company

L. K. Del'Homme

Superintendent of Engineering, Houston Lighting & Power Company

S. L. Rieves

General Engineer, Houston Lighting & Power Company

Extracts from a paper presented before a meeting of the EEI Electrical Equipment Committee, New Orleans, La., November 2-3, 1953

THE early history of Houston Lighting & Power Co. follows a general pattern familiar to most of us. Houston, Texas, had a population of some 20,000 persons in 1882 when the municipal authorities granted the newly formed Houston Electric Light and Power Co. a franchise to build and operate an electrical plant for arc lighting service. Then followed incandescent lighting, and, gradually, the multitude of services now performed by electricity were added.

In common with many utilities, the early history of the company was fraught with difficulties of all kinds, including competition, the flat-rate system of charges, loss of equipment by fire, and difficulty in financing. As a result, the property was owned and operated by five separate corporations during the 20-year period, 1882 to 1902.

Population and Industrial Growth

The next 20 years, 1902 to 1922, were characterized by accelerated population and industrial growth of the Houston area, induced largely by the excellent shipping facilities and low freight rates made possible by the construction of the Houston Ship Channel in 1914. Paradoxically, in this period of the area's growth and prosperity, the company was experiencing difficulty in financing its expansion to meet increasing electric power demands. This condition compelled the company to limit its operations to the city limits of Houston and the immediately adjacent areas.

Thus, at the close of this period in January, 1922, the company had one steam-electric generating plant and one distribution system serving one community. The plant capacity was 22,500 kw and the peak load, 20,000 kw, with annual energy sales of 76,600,000 kwhr. There was no transmission. The distribution system consisted of 405 pole miles of 4- and 12-kv lines and 5 miles of underground duct run. The service area was about 39 square miles with a population of about 175,000. There were 29,700 customers.

March of 1922 marked the emergence of the company into full maturity. From that time on, as a result of good management backed by adequate financing, the planned and orderly development and integration of Houston Lighting & Power Co. has been carried forward consistently. Realizing that for a city like Houston to grow and prosper the surrounding area must likewise develop, the company, in 1922, revised its policy from one of isolation, covering only one city, to one of development of all contiguous territory.

In accordance with this policy, a system of transmission lines was designed to make electric service available to communities within a 60- to 80-mile radius of Houston and to provide for the acquisition of existing isolated properties. Under this plan the area served by the company has now been expanded to include a well integrated territory of 5600 square miles, occupying all or parts of 11 counties in the Gulf Coast region of southeast Texas. This area is shown in Fig. 1. Its estimated 1953 population is 1,250,000, representing a density of about 223 persons per square mile. The principal cities are Houston, with a population of over 700,000 within the city limits and over 1,000,000 in the metropolitan area, and Galveston, with a population of about 80,000. These two centers combined account for 86 per cent of the total population served.

The growth of the entire Gulf Coast region in the past few years has been phenomenal. Houston is one of the brighter spots in the region. It is the principal manufacturing center of Texas, if not the entire South, and is supported by a large agricultural industry and an abundance of natural resources, including fuel and industrial raw materials. To complement this industrial potential are the excellent transportation facilities afforded by the Houston Ship Channel, six major railroad systems, and networks of modern highways and airlines. The Port of Houston is second only to New York in total tonnage handled; but, more important, the Ship Channel area has attracted many huge industries, such as oil refineries, chemical plants, steel mills, and the like, whose plants line the banks of the channel and contribute greatly to the growth and prosperity of Houston's metropolitan area.

System Expansion

As a result of the industrial and population growth of the territory and of the program of extending service to new areas, the total number of customers has increased from 30,000 in 1922 to over 360,000 in 1953. Hundreds of miles of transmission lines have been built, and the distribution system has been increased twentyfold. From the single 22.5-mw generating station in 1922, system generating capability has increased to 836 mw in 1953, in four major stations and one small standby plant. This is supplemented by power interchange with the Lower Colorado River Authority and by several industrial interconnections on an "if, as, and when" basis. The 1953 net maximum hour was 860 mw with an estimated energy output of

4,500,000,000 kwhr at an annual load factor of 60 per cent.

Further illustrating the growth of the system, total plant account at the end of 1952 was $179,000,000, or about two and one-half times the 1946 plant account. Between 1951 and 1952 net plant additions increased 38.1 per cent as compared to the national average of 21.8 per cent. Additional indices of relative growth are as follows:

	Per Cent Increase of 1952 over 1951	
	HL&P Co.	National
Net System Load, Kw	16.8	7.1
Energy Sold, Kwhr	20.9	7.7
Fuel Consumption	14.2	4.5
Industrial Sales, Kwhr	28.1	6.0
Residential Customers	5.7	3.9

The transition from an almost entirely agricultural area to the present well-balanced agricultural, industrial, and commercial economy has brought about a change in the shape of the load curve. The early years were characterized by a system winter evening peak normally occurring between 7 and 8 p.m. in December. Since 1939, the annual system peak has occurred during the summer months, generally in August between 2 and 3 p.m.

With the general picture of the area and system in mind, let us now have a closer look at some phases of system planning and development.

System Load Growth

The growth of system load from 1916—the earliest date from which continuous data are available—to 1953 is indicated by Fig. 2, on which system load is plotted by years on a semi-logarithmic scale. Superimposed on the load curve are calculated load-growth trend curves which indicate considerable variation in load-growth rates from time to time because of wars and changing economic conditions.

Curve A indicates an average annual load growth of 13.9 per cent for the 37-year period, 1916-1953. The pre-depression portion of this period, prior to 1930, when the rate of load growth was 20.6 per cent per year, was characterized by territorial expansion as well as development of the original territory. For this reason, although inclusion of the depression period through 1933 reduces the annual rate of load growth to 15.2 per cent, it is felt that this period is not as representative of present-day conditions as is the experience since 1933.

For the 20-year period since 1933, Curve B indicates that the rate of load growth has averaged 12.8 per cent per year, although it has varied widely from time to time as a result of wars and changing economic conditions. For the first seven years of this period, 1933 to 1940, immediately preceding our formal entry into World War II, the annual rate of increase was 9.9 per cent (Curve C); and for the next 6-year period, 1940 to 1946, including World War II and the readjustment period following V-J Day, the rate averaged 12.3 per cent per year,

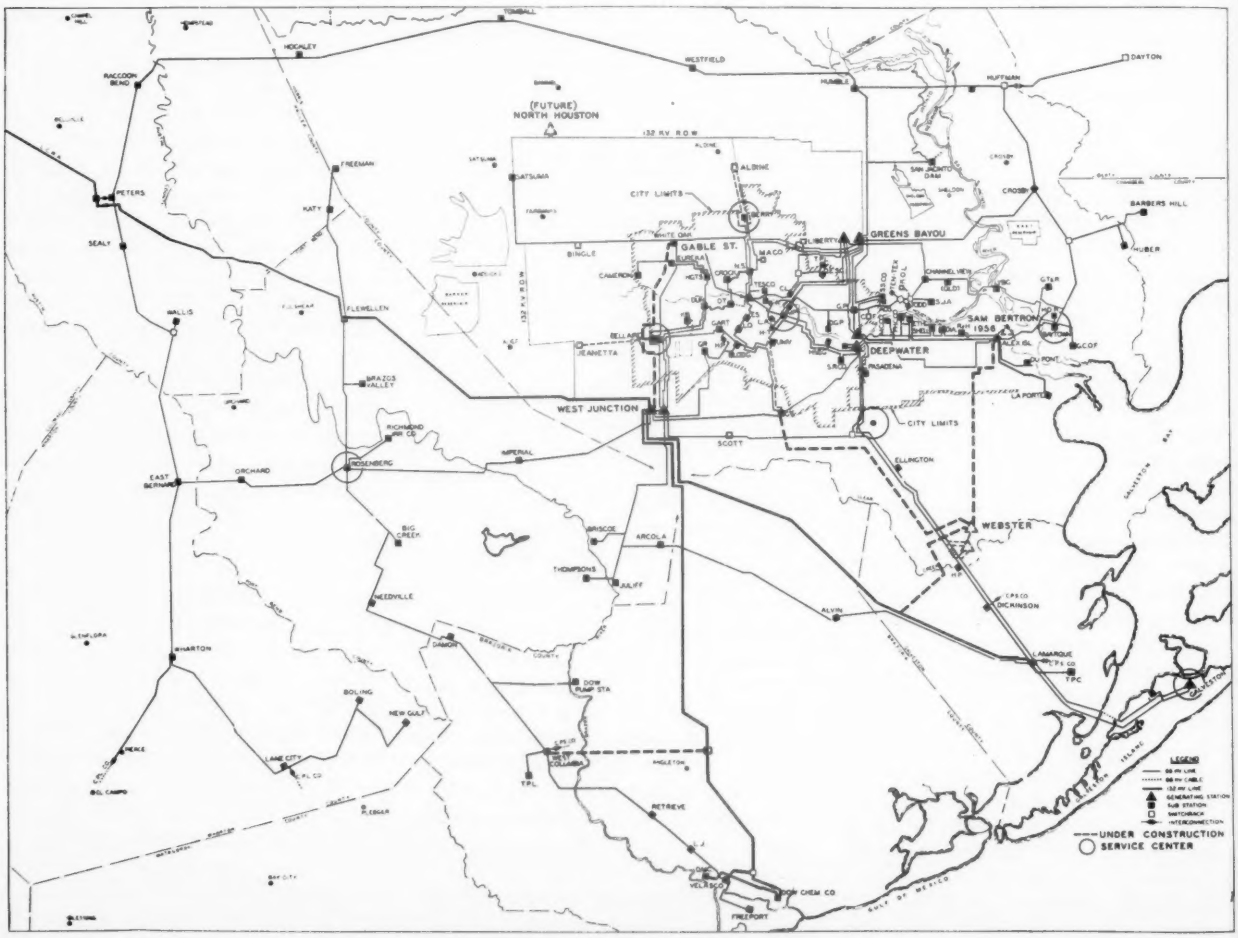

Fig. 1—System Map of Houston Lighting & Power Co.

(Curve D). With the cessation of hostilities in 1945 and the accompanying almost certain loss of war loads, the immediate future load-growth picture was, to say the least, a little uncertain; but conversions to civilian-goods production was so rapid that the 1946 system maximum hour load of 301 mw was only 8 mw below the previous high. By 1949 the load had grown to 434 mw, and in 1953 had increased further to 860 mw. Thus, in the 7 post-war years, the system load has almost trebled, representing an average rate of growth of 16.2 per cent per year (Curve E). Meeting this tremendous load growth has taxed the ingenuity of our system planners and has required the utmost cooperation of our neighboring electric systems and of the DEPA, as well as of our interconnected industrial customers.

What will be the pattern of future load growth? Will it follow the pre-war trend of 9.9 per cent, or will it follow the post-war trend of 16.2 per cent? Will all of the 330 mw of defense connected loads expected on the Houston system by 1956 materialize, or will they be 630 mw? What part, if any, of these defense loads will become permanent? Will industry and population continue to migrate to the Houston area? What is the future for year-round air conditioning?

The answers to these and other related questions hold the key to future load growth. In spite of the fact that definite answers are not readily forthcoming, system load forecasting and planning must go forward, since load forecasting is of paramount importance in system planning, and all phases of such planning have a common objective, namely, the satisfying of future load requirements at the lowest possible long-term cost commensurate with the standard of service required. It is noted that in load forecasting, as in other problems, the validity of basic assumptions will determine the accuracy of the results obtained.

For the Houston system, future load growth possibilities are indicated by three extensions of the system load curve shown in Fig. 2.

The bottom curve is the official estimated load curve. Originally it represented a load growth of about 10 per cent per year extended from the 492-mw value of 1950 and indicating about 1700 mw for 1963. The 10 per cent load-growth rate is about the same as that (Curve C) which had obtained during the 7, more or less "normal," post-depression years, 1933-1940, preceding World War II. The present curve is the result of numerous revisions occasioned by the unprecedented demands resulting from the Korean War. The portion of the curve through 1956 is now based on known new loads and changes in existing loads as determined through contacts with present and prospective wholesale, industrial, and commercial customers, plus trended values of the balance of the load, modified to give due weight to the effect of new developments, such as increased air conditioning and new utilization equipment and methods. The balance of the curve, from 1956 to 1963, was obtained by arbitrarily extending it to the 1700-mw value originally estimated for 1963. As it now stands, the estimated load curve represents annual load-growth rates of 8.3 per cent through 1956 and 6.5 per cent from 1956 to 1963, resulting in an average growth of 7 per cent for the 10-year period. Should the load follow this curve, it would increase to 1240 mw by 1958 and to 1700 mw by 1963.

The middle curve is an extension of Curve B, representing the 12.8 per cent average annual rate of load growth which has obtained for the 20-year post-depression period, 1933-1953. Should the system load continue to follow Curve B, it may be expected to double in about 6 years, increasing from the 1953 value of 860

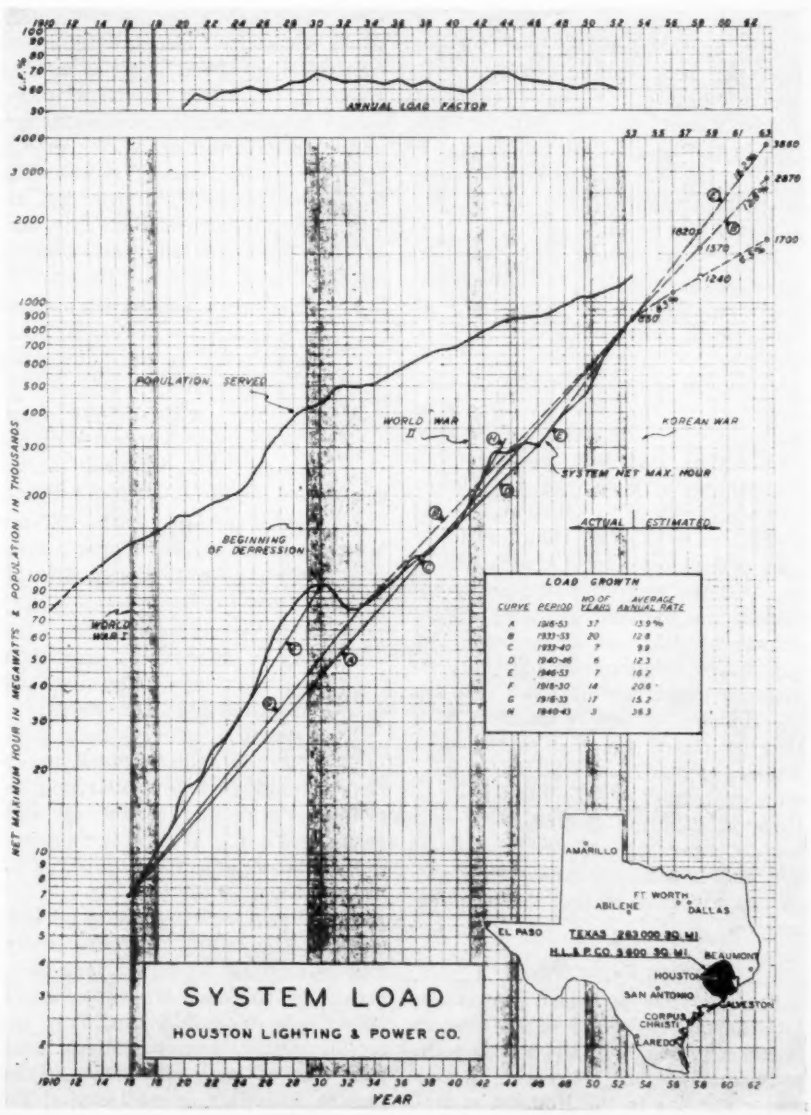

Fig. 2—Extensions of the System Load Curve

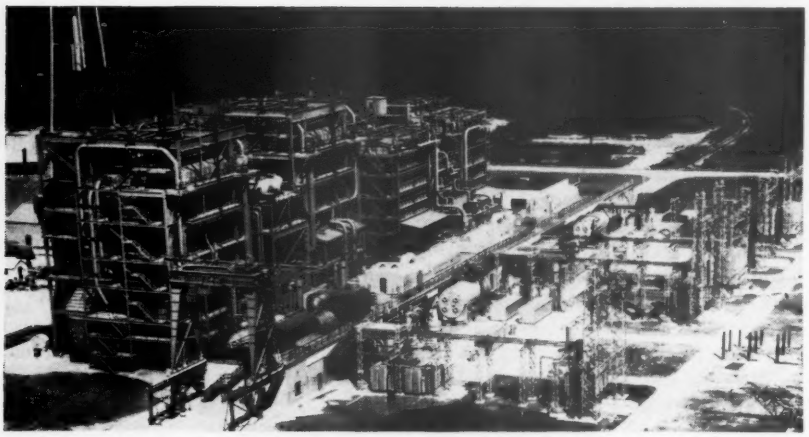

Fig. 3—Aerial View of the Greens Bayou Station

mw to 1570 mw by 1958 and to 2870 mw by 1963.

The top curve is an extension of Curve E, representing the 16.2 per cent per year rate of load growth which obtained for the 7-year post World War II period, 1946 to 1953. Should the load follow this curve, it would more than double each 5 years, reaching a value of 1820 mw in 1958 and 3860 mw by 1963.

What to do about this situation poses the $64 question for our system planners. The 16.2 per cent rate of load growth indicated by the top curve seems to be a rather remote possibility. The bottom curve, with the possible exception of the next two or three years, seems to be ultra-conservative. The actual load will probably fall somewhere between the two lower curves. Tending to substantiate this conclusion is the fact that for the 7-year period just passed, during which the 16.2 per cent rate of growth obtained, the national average rate of growth was less than 10 per cent. Yet for the forthcoming decade the estimated average rate of 7 per cent for the Houston system is identical with that estimated for the nation as a whole. (From *Electrical World*, September 21, 1953.) In any event, we at Houston Lighting & Power Co. are acutely aware of our responsibilities and the import our present-day decisions will have on the system of tomorrow.

System Power Supply

For the 1953 peak-load season the total normal capability of the system is 896 mw, of which 836 mw is company steam-electric generation in four major stations in the Houston metropolitan area and one small standby station in Galveston. The remaining 60 mw of system capability is hydropower purchased from Lower Colorado River Authority through a 132-kv interconnection about 50 miles west of Houston. Location of these power supply sources and the new plants now under construction are shown in Fig. 1. The existing plants, representing a total net capability of 834 mw, are all closely interconnected on a network of 66-kv lines encircling and traversing the City of Houston. They are:

1. Gable Street, with 80 mw in seven units, located in the City of Houston adjacent to the downtown business district;
2. Deepwater, with 153-mw capability in six units, located on the Houston Ship Channel in the heart of the industrial district;
3. West Junction, with 236-mw capability in four units, located in the southwest corner of Houston; and
4. Greens Bayou, with 365-mw capability in four units, located at the eastern edge of the city about 7 miles north of Deepwater.

These stations are all natural-gas fired with oil standby and all, except Deepwater, are wholly or partially dependent on cooling towers for condensing water. West Junction and Greens Bayou are of the unit-type arrangement.

Selection of each of these plant sites was based on careful studies of several locations, weighing such factors as proximity to load, transmission requirements, availability of fuel and cooling water, transportation facilities, cost of land, and other related factors, including over-all capital and operating costs.

The mild climate of the area coupled with cost advantage directed our attention to outdoor-plant design. The company's first experience in this field was in 1939 when a 25-mw plant extension was made at Gable Street with a semi-outdoor boiler and an extension of the conventional indoor turbine room. This was followed, in sequence, in 1943 and 1947 by the first two units at West Junction where both the boilers and turbines are semi-outdoor installations with outdoor boiler settings, improvised weather protection on splash-proof motors, and sectional, removable, steel walk-in housings over the indoor-type turbo-generators. A second semi-outdoor installation at Gable Street was made in 1950, following the same general plan as the 1939 extension, since this was an extension of an existing conventional indoor plant.

Advances made in the development of the outdoor design, including equipment suitable for outdoor installation, permitted installation, in 1949, of the company's first full outdoor plant. This was the Greens Bayou A Plant, which consists of two 60/66-mw units with a combined capability of 145 mw. This installation has served as a model for subsequent supply capacity additions. The West Junction B Plant, with two 60/75-mw units and a capability of 160 mw, was placed in service in 1951, and the Greens Bayou B Plant, with two 110-mw units, was completed in 1953. Fig. 3 is an aerial photograph of the Greens Bayou Station.

Thus, of the 836-mw total system generation in 1953, 661 mw, or 79 per cent, is of outdoor or semi-outdoor type. The greater part of this, 523 mw, is full outdoor type. Even in the mild climate of the Houston area the outdoor plant requires some protection against freezing, particularly in the case of instrument piping and small lines. So far, the designs have proven sound and operating records compare favorably with those of conventional indoor plants.

Underlying the company's power expansion program is the objective of self sufficiency in generation, since the total power available through interconnections, even on an emergency basis, is considerably less than the capacity of our largest unit. In order to achieve this objective it will be necessary both to close the gap between existing capability and present load, and to provide for the rapidly growing load.

Accordingly, prior to the peak of 1956, four units totaling 550-mw net capability are scheduled for installation on the system and an additional 12 mw will be gained by alterations to two existing units in 1954. The new plant locations are indicated in Fig. 1. Two 110-mw units scheduled for operation late in 1954 and early in 1955 will constitute the initial installation at the new Webster Plant now under construction about halfway between Houston and Galveston. One 165-mw unit will be added to the existing Deepwater Plant prior to the 1955 peak season, and another 165-mw unit is expected to be in operation early in 1956 at the new Sam Bertron Plant, to be located about 10 miles east of Deepwater. The Webster and Sam Bertron Stations will be full outdoor design modeled on Greens Bayou, while the new unit added at Deepwater, which is a conventional indoor station, will be the semi-outdoor type, that is, with the boiler outdoors and the turbo-generator in an extension of the present turbine room. All four units will utilize nearby bodies of surface water for cooling purposes. This expansion program, totaling 562 mw by 1956, will result in a total system capability of 1398 mw, of which 1223 mw, or 93 per cent, will be of the outdoor and semi-outdoor type.

The system power supply in 1953 and that planned for 1954, 1955, and 1956, as indicated in Fig. 4, Projected System Load and Capability Curve, are summarized below:

System New Capability—Mw

	1953	1954	1955	1956
Generation				
Existing (1953)	836	836	836	836
New Construction	—	122	397	562
Total Generation	836	958	1233	1398
Purchased				
LCRA	60	40	30	20
Total Purchased	60	40	30	20
Total Capability	896	998	1263	1418

The magnitude of this expansion program is indicated by the fact that in the 4-year period, 1952-1956, more generating capacity will be added to the system than was added in the entire 70-year period prior to 1952.

As a result of this power expansion program, which is predicated on the official load growth estimate of 8.3 per cent through 1956, system generating capability is expected to be firm, on the basis of the largest unit out, by 1955. Should the load growth exceed the 8.3-per cent rate, as it may well do, our long-range expansion program would be accelerated to the extent necessary to maintain a firm power supply. This might mean that the 165-mw No. 2 Sam Bertron unit, now scheduled for 1958, would be moved up to 1957, or possibly to 1956, delivery of equipment permitting.

Whatever the load growth might be, we plan to maintain a firm power supply, and, accordingly, additional units for years subsequent to 1956 at existing and planned sites, as well as at completely new sites, are now under consideration. The recently acquired Sam Bertron Station site in the east end of the system is capable of being developed to 1000-mw capacity, and the purchase of another site in the west side of the system, also capable of being developed to 1000 mw, is now contemplated. With the uncertainty of the times and the possibility, if not probability, of another war emergency, it is imperative that plans be well-founded and flexible enough to permit rapid expansion. We must not be "too little nor too late."

Transmission

The present transmission system is shown in Fig. 1. It is built on the loop principle and serves the dual purpose of tying the generating plants together and of supplying the various distribution substations located at load centers, as well as individual loads which are too large or otherwise unsuited for service from the distribution system. The substations supplying the City of Houston are served from two 66-kv concentric loops interconnected by several trunk lines. The inner loop, to which Gable Street Station is connected, lies well within the city proper; the outer loop, to which Deepwater, West Junction, and Greens Bayou are connected, entirely encircles the city. Other 66-kv loops, serving the outlying areas, extend in all directions from the several generating stations.

The 132-kv system is also being developed on the loop principle and will ultimately encircle the City of Houston and the Ship Channel industrial area. This loop for which most of the right-of-way has already been acquired will provide additional and higher capacity tie lines between all major generating stations and will also be used for bulk power transmission.

The high-voltage transmission system was initiated in 1924 with the construction of two 33-kv tie lines between the Gable Street Plant and the then newly constructed Deepwater Station. A third such tie line was added in 1926, and in 1927 the inner 33-kv loop was built, connecting the generating plants with a circle of five distribution substations each located about 3 to 5 miles from the center of Houston.

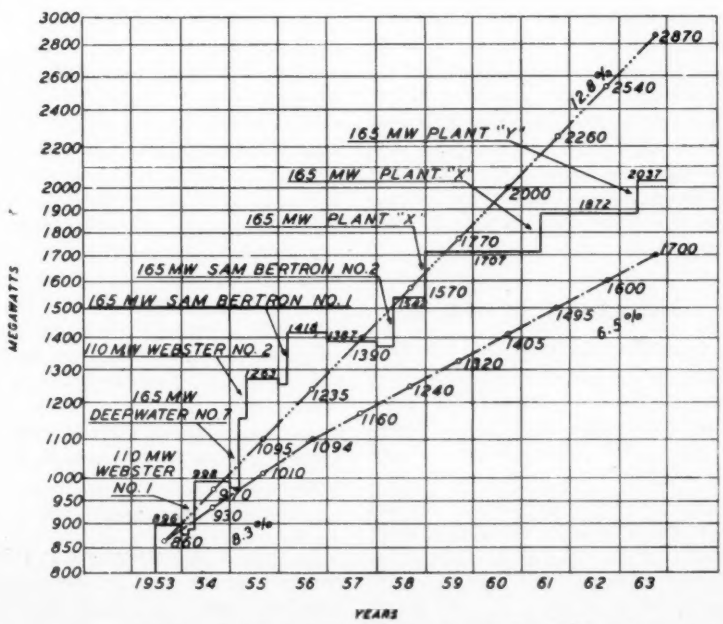

Fig. 4—Projected System Load and Capability Curve

Concurrently, in line with the policy of developing the surrounding territory, a 33-kv line was extended eastward from Deepwater, along the south side of the Ship Channel to Baytown, a distance of about 15 miles. A second such line was built in 1927 along the north side of the Channel, closing the loop and making service available to the entire Ship Channel area. At the same time, the first 66-kv line was extended westward from Deepwater to Rosenberg, East Bernard, and Wharton, a distance of about 71 miles. By the end of 1939 the transmission program had resulted in the completion of 66 pole miles of 33-kv lines and 492 pole miles of 66-kv lines, serving 139 communities, of which 113 had previously had no electric service.

Early in the program, it had become apparent that 33-kv transmission would not be adequate to serve the future loads in the Houston area. Accordingly, a program of gradual conversion to 66 kv was adopted. By 1949 this program had been completed and 33 kv had passed out of the picture.

Concurrently with this conversion of 33 to 66 kv, the construction of 132-kv transmission lines was initiated. The first such line was constructed in 1940 from West Junction Plant to the Dow Chemical Co. at Velasco, Texas, a distance of about 53 miles. This was supplemented later by construction of the Peters-West Junction 132-kv line for the purpose of increasing the capability of the LCRA interconnection.

The transmission system presently consists of 878 miles of 66-kv and 132-kv overhead lines; 2.2 miles of 66-kv submarine cable across Galveston Bay; and 1.9 miles of 66-kv pipe-type underground cable through the principal business district of Houston. This cable connects Gable Street and the Downtown Substation which serves one of the downtown Houston secondary networks.

Standard Voltages and Conductor

The standard voltages for the transmission system are 66 and 132 kv; and in view of the close proximity of generating plants and major load centers, it appears that transmission voltage will not exceed 132 kv for some time to come. Present practice is to use 132-kv construction on 66-kv lines planned for future 132-kv operation. About 50 miles of such lines are now in operation at 66 kv.

Until recently, the company's standard conductor for heavy transmission lines was 397.5 mcm ACSR, rated at 50,000 kva at 66 kv and 100,000 kva at 132 kv. Post World War II load conditions and the resulting closely knit transmission system and high fault current conditions coupled with the difficulty of securing additional right of way made it advisable to increase transmission-line capacities rather than add new lines. After extensive study, 800-mcm all-aluminum cable was adopted as the heavy-transmission conductors. This choice was influenced by the fact that existing towers designed for 397.5 ACSR could be utilized by stringing the all-aluminum cable to approximately the same tension and sag as the 397.5 ACSR. Main-line conductors are now rated at 100 mva at 66 kv and 200 mva at 132 kv. As an alternate to building additional lines, it is planned ultimately to reconductor all of our major tie lines to 800 mcm. Emphasizing the high load density of the area is the fact that the system plant capacity per mile of primary line, 66 kv and above, more than doubled between 1946 and 1952, increasing from 348 kw per mile to 700 kw per mile.

New transmission-line construction, scheduled for completion during 1953 and 1954, will add 39 circuit miles of 66 kv and 73 circuit miles of 132 kv, all of which, with the exception of about 21 miles, will be conductored with 800-mcm all-aluminum cable. During this same 2-year period about 31 miles of existing 66-kv line will be reconductored with 800-mcm all-aluminum cable.

Steel towers are employed in highly developed areas where land is expensive and heavy concentration of transmission is required. In undeveloped territory, the general practice is to use X-braced and knee-braced wood H-frame structures. Double static wires are standard for all 66- and 132-kv lines. Double plank arms are used on the 132-kv H-frames. Properly guyed, this type of construction has proved adequate to resist hurricanes, to which this area is frequently subjected. While ice loading is a factor which must be considered, the relatively mild winters reduce this hazard to a minimum.

Switching

As emphasized elsewhere in this paper, the service area of the system is relatively small and loads are highly concentrated. Thus, with the constantly increasing tie-line and generating capacities there has been a corresponding increase in fault currents. Since the end of World War II this trend has been accelerated.

At the close of the war and for about one year thereafter, the largest OCB on the system was rated at 1500 mva. By 1948, the maximum fault duty had increased to the extent that 2500-mva breakers were required in some locations. Installation of the two 110-mw units at the Greens Bayou Plant, along with associated transmission, increased fault currents at certain locations to a point beyond the capacity of the then existing 2500-mva breakers. Consequently, for Webster No. 1, 1200-amp, 69-kv, 3500-mva interrupting capacity breakers, convertible to 5000 mva, were purchased. For Webster No. 2, 138-kv, 5000-mva breakers will be installed. With the planned installation of the second 165-mw unit at the new Sam Bertron Plant probably in 1958, fault duties will exceed 3500 mva at that station, necessitating the use of 5000-mva, 69-kv breakers.

As the fault duties increase at the major plants, there are corresponding increases throughout the system. Thus, as new breakers of higher interrupting capacity replace existing lower rated breakers, a chain reaction is set off, resulting in pushing the smaller breakers further out on the system. The purchase of one new breaker may result in as many as three or four changeouts. This expensive checker game has been necessary, in part at least, because the manufacturers had not, until recently, fully developed a 5000-mva breaker in the 69-kv class.

Distribution

Early distribution in Houston was at 2300 and 4000 v, with the first substation built in 1922 being supplied at 12 kv. At the end of 1922 the distribution system consisted of 49 miles of 12-kv lines, 430 miles of 4-kv class lines, and one 12-kv substation.

By 1939 the 12-kv distribution lines had increased to 1640 pole miles and the 4-kv to 1470 pole miles, with 263,500 kva of line transformers. Also during this period the number of substations had grown to 52, with a rated transformer capacity of about 205,000 kva.

Increasing load density made apparent the advantages offered by 12-kv over 4-kv distribution. Accordingly,

12 kv has been adopted as standard distribution voltage. All load growth is being served at this voltage through the process of converting 4-kv fringe areas to 12 kv. Under this program the area served by the 4-kv distribution systems in the Houston and Galveston metropolitan areas will gradually be reduced and the 4-kv load limited to present substation capacities.

Distribution lines at the end of 1952 amounted to about 8200 pole miles, and line transformers to 651,500 kva, representing increases over 1939 of 165 and 147 per cent, respectively. The number of distribution substations had increased to 78 with a rated transformer capacity of about 655,000 kva. To this, 112,500 kva in self-cooled transformer capacity will be added during 1954.

Greatest Potential Reward

The distribution system probably offers the system planner his greatest potential reward, and yet, because it consists of a large number of relatively small operations, it is most likely to receive the least attention. The distribution system of the Houston Lighting & Power Co. represents about 50 per cent of the total plant account. For this reason, plus the fact that the distribution lines serve the customers, it receives prime consideration in our planning.

Metropolitan stepdown substations have been standardized. These substations are of the outdoor, automatic, unattended type. Presently, nine of them are equipped with supervisory control and current plans call for installation of such equipment in 62 substations by 1957. The standard 66-kv substation structure consists of box columns and trusses with several levels of busses. Thermal capacity is normally designed on the basis of terminating three or more 100-mva capacity lines. The 66-kv busses, switches, connections, etc., are designed to withstand short circuit stresses, comparable to maximum interrupting duties which are expected to be imposed by the system.

Electrical design of the 12-kv section is based on the required thermal capacity for an ultimate of 40,000-kva transformer capacity in four units with eight 5000-kva, 12-kv feeder positions. Structural design of the 12-kv section is based on stresses comparable to 250-mva interrupting duty, normally imposed by three 7500/10,000-kva transformers. When four transformers are installed, the 250-mva limitation is achieved by operating the 12-kv bus split into two separate sections of 20,000-kva capacity each. In the event of loss of one transformer, the 12-kv bus sections may be reconnected for the duration of the emergency. This basic 66/12-kv transformer bay with 12-kv feeder positions can be used for a rural substation with a single 66-kv supply. It may be expanded into the complete substation by addition of the standard 66-kv switching sections and additional transformer and feeder sections.

As in the case of generation, load forecasting is vital to distribution planning. For example, total system load growth between 1953 and 1956 is expected to approximate 234 mw. Since a large part of this will be on the distribution system, it is clear that intensive examination of the service area is required to determine the pattern of the growth. In other words, it is essential to make load forecasts by load centers. The 112,500 kva in transformer capacity scheduled for 1954 was arrived at in that manner.

Overhead Planning

Looking forward to increasing load density in already developed urban areas and to the complete development of all vacant areas, the company's 12-kv overhead planning policy has recently been revised. The new planning policy provides for 12-kv feeders and mains in advance of area development and sets up minimum sizes of distribution conductors. For example, in all incorporated towns and cities, all 12-kv main feeder ties between major substations, and other feeders as far as the first main branch out of the substation, will be conductored with at least 4/0 copper or its equivalent to provide satisfactory voltage as well as continuity of service. For 5000-kva load per circuit, 4/0 copper 12-kv feeders result in satisfactory voltage conditions at a distance of about 3.7 miles. Thus, new substations on the system will be located from 5 to 7 miles apart. Intermediate substations will be constructed, as the original substations from which load is to be transferred have reached about 50 per cent of the transformer self-cooled capacity.

Distribution voltage regulation is accomplished by use of individual feeder regulators on the 4-kv and bus regulation on the 12-kv system. Supplementary regulation is provided by switched and fixed capacitors out on the feeders, and by raising generating system voltages about 3 per cent over the daily peak to improve regulation of the 66-kv system and to maintain satisfactory voltage to large block power users.

Kilovar Supply

The principal sources of kilovar supply for the Houston Lighting & Power Co. are the generators and static capacitors, there being only three synchronous condensers with a combined rating of 19,000 ckva on the system. Currently, we do not expect to add additional reactive in synchronous condensers.

For the 1953 peak season the total capacity in fixed and switched capacitors installed on the system was 360,000 ckva. A minimum reserve reactive capability of about 10 per cent is maintained in the rotating machines for emergency conditions. Loss of one of the larger capacitor banks or of a heavily loaded line requires additional reactive generation of 3000 to 20,000 kva to prevent a transmission voltage sag.

Of the 360,000 ckva in capacitors, about 150,000 are required for transmission purposes to provide satisfactory voltage levels and safe generator reactive loadings. These capacitors are switched in and out of service on instructions from the dispatcher. The remaining 210,000 ckva in capacitors are on the 4-kv and 12-kv distribution systems, having been installed as required for power factor correction of new loads which nowadays are predominantly poor power factor motor loads, such as air conditioning. As an indication of the need for capacitors, it is noted that between 1946 and 1952 air conditioning installed on the system increased from 23,500 tons to 151,000 tons. In 1952 alone, over 34,500 tons were added, of which 19,600 tons were installed in residences. Information presently available indicates that 1953 installations will equal or exceed 1952. The foregoing figures of capacitor installations, of course, do not reflect customer-owned capacitors, representing in total a sizeable block of kilovar capacity. Installation of power factor correction by customers is encouraged by our rate schedules, which are based on kva demand.

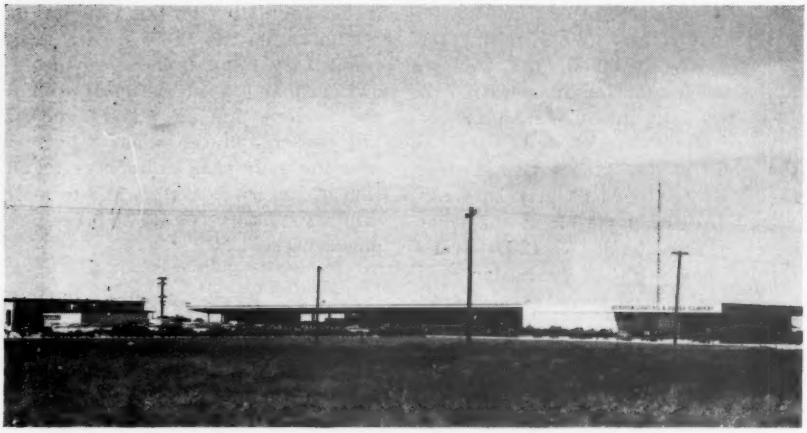

Fig. 5—South Houston Service Center

At the time of the 1953 peak, there were on the system 42 ckva in static capacitors for every 100 kw of load. Of more significance is the fact that for the two-year period, 1951-1953, 85 ckva in capacitors were added for every 100-kw increase in load. This relatively high ratio resulted from unusual conditions which existed in 1952, requiring the rapid addition of an abnormally large amount of reactive supply to meet the peak conditions when 130 mw, or one-sixth of the load, had to be imported through transmission interconnections. Future kilovar requirements are forecast for periods of two or three years in advance and are revised yearly. Distribution system requirements are forecast by substations, as are the kilowatt load requirements. Transmission capacitor requirements are determined by engineering studies, including use of the a-c network analyzer. Based on present plans, it is expected that capacitors will be added to the system at a minimum rate of 1 ckva for every 2 kw in new distribution load.

A-C Network

The original underground system in Houston was placed in operation in 1910 to serve the principal business district. It was designed to operate at 2300 v with radial feeders. In 1922 this system was modified and expanded and the voltage increased to 4000 v. It soon became apparent, however, that adequate service for the rapidly growing downtown area could not be provided at 4000 v. Accordingly, in 1928 the policy of installing 12,000-v cables was adopted in anticipation of a future change to 12-kv distribution. As a result of this policy, practically all of the required 12-kv feeder cables were already in place when the decision was made in 1930 to install a 208/120-v secondary network served at 12 kv.

Today the principal business district in Houston is served by three 208/-120-v secondary networks supplied at 12 kv and by a diminishing 4-kv radial system. This underground system serves a load of about 78 mva concentrated in an area of one-third of a square mile equivalent to a load density of about 240,000 kva per square mile. For the larger network loads, the policy has been to use 750-kva, 3-phase network transformers with 2500-amp network protectors mounted on the side of the transformer. This side mounting, which was adopted by us prior to adoption of the present industry standard, will be continued because of space limitations in the vaults which are generally located in customers' building basements.

With increasing load density in the downtown area, due to air conditioning, higher illumination requirements, and larger buildings, there has been an increasing customer demand for a service voltage higher than 208 v. Motor sizes of 500 hp are not uncommon and a few 800-hp motors are in use in the secondary network area. A new 35-story building to be constructed in downtown Houston will have a total load of over 6000 kva including three 1000-hp motors. The difficulties which would be encountered by the customer if served from the 208/120-v network are apparent. Accordingly, after detailed investigation and joint study with customers' engineers, we agreed to provide spot network service with secondary voltage of 480/277 v; after considerable study of transformer size and voltage best suited to this application, 1000-kva units rated 13,200-480/277 v with four 2.5 per cent full capacity taps below normal were adopted. Plans are now under way for making this service available for certain other large new loads.

As in the case of the 750-kva network transformers, the network protectors will be side-mounted, and the primary cables will enter the bottom of the HV chamber. In contrast with the 750-kva transformers, the 1000-kva units will be supplied with a high-voltage disconnect switch to avoid working the 480-v network protector hot. The switch will not be provided with a grounding position as grounding switches are already installed on all 12-kv network feeders, usually in the first vault served from the feeder.

General Facilities

With the growth and development of the company's service area and the resulting traffic congestion, the traveling time of construction and maintenance crews became a major item of expense and a serious obstacle in maintaining service. To counter this, a program of decentralizing distribution operations was initiated in 1929 with construction of the first service center. This became the base of operation for the overhead system forces, the underground headquarters remaining at the old Gable Street Plant location. These facilities served our needs adequately until 1939 when increasing area development and traffic congestion made necessary further development of the previously planned decentralization plan. As a result of this program, we now have four overhead and one underground service centers at strategic locations in metropolitan Houston, and three additional service centers in the outlying areas—Galveston, Baytown and Rosenberg. The South Houston Unit, shown in Fig. 5, is typical of these service centers.

Each service center is a well-balanced unit providing material and pole storage and truck docking facilities to permit night loading of line trucks; automotive and substation maintenance shops; air-conditioned office, auditorium, and first-aid space; and ample parking spaces for company-employee and public use. Each center is staffed with engineering and commercial personnel in addition to the distribution construction, operation, and maintenance forces. These centers serve a definitely prescribed geograph-

ical area, and all minor construction orders originate and are executed by the proper service center. This program has been fully justified by the savings realized, and by the prompt and efficient customer service resulting from it.

Equally important in the matter of efficient distribution construction, operation, and maintenance is the two-way FM radio communication system installed initially in 1946. The system now includes three base stations with 360-ft antennas, 14 fixed stations at service centers, division headquarters, and generating stations, and approximately 250 mobile stations in company trucks and cars.

Since the early days of World War II, regional planning has had a place in our system planning. In February, 1942, the electric utilities in our area voluntarily formed the South Texas Power Pool in order to make available for the war effort the maximum in power resources. Although this was an informal organization with no contracts other than those covering the interconnections between individual companies, it helped to establish in this area during World War II, the record that every electric service requirement was met on time and no customer was asked to curtail load because of a shortage of electric power. At one time during World War II this pool was connected through the Southwest Power Pool with others in the Midwest, and at that time the base station controlling the frequency in south Texas was located in Philo, Ohio.

Following the war, the pool has continued in operation under the more dignified name of South Texas Interconnected Systems. Its aggregate generating capacity is now in excess of 1650 mw. Meetings are held quarterly to review, and revise if necessary, the load and capability estimates prepared each September for the ensuing year. All members cooperate in preparation of compatible maintenance schedules and in the judicious use of steam and hydro generation to make the maximum generating capability of each interconnected member serve as reserve capacity for all others. This type of cooperation between members of the pool, three of which are publicly owned, exemplifies system planning in its broadest sense.

In the foregoing remarks an attempt has been made to highlight some of the planning problems confronting the Houston Lighting & Power Co. Some of these problems are common to all electric utilities; some, perhaps, are not so widespread. It is our hope that this discussion of our approach to these problems will be helpful to others.

Paul S. Clapp

PAUL S. CLAPP, retired utility executive and former Managing Director of the National Electric Light Association, died at his New York, N. Y., home recently at the age of 63.

Mr. Clapp graduated from Iowa State College in 1913 with a B.S. degree in electrical engineering and ten years later was honored by his Alma Mater with the professional degree of Electrical Engineer. Following graduation, he worked with Western Electric Co. and Allied Machinery Corp., successively, before serving as a U. S. Army Signal Corps captain during World War I.

After the war he remained in Europe to work with the Peace Commission in Paris. Later he became affiliated with the American Relief Administration and, among other assignments, worked on re-establishing and supervising operation of telephone and telegraph communications throughout Central and Southeastern Europe. For his excellent work on this project in Rumania, the Rumanian government knighted him. He interrupted his ARA activities for a year while he assisted business interchange between the United States and Western Europe and then rejoined ARA to supervise provisioning of an area of 470,000 population in Russia.

Upon his return to America in 1923, Mr. Clapp was called to Washington, D. C., and appointed assistant to the then Secretary of Commerce, Herbert Hoover, who had been chief of ARA. Some of his assignments as Mr. Hoover's special assistant were director of the "Northeastern Super Power Survey;" secretary of the Second National Radio Conference; and secretary of the St. Lawrence Commission of the U. S.

In 1926 he was appointed managing director of the National Electric Light Association. He held that position until 1932, when he resigned to accept the vice presidency of Columbia Gas and Electric Co. During subsequent years he was made vice president of that company's affiliates, Columbia Engineering Corp., Ohio Fuel Gas Co., The Cincinnati Gas & Electric Co., and The Dayton Power and Light Co.

Active in work of the Edison Electric Institute and National Association of Manufacturers, Mr. Clapp was also a member of AIEE and various social and civic groups.

In 1945 he was awarded the Marston Medal for his engineering achievements.

Last Call!

FEBRUARY 1, 1954, IS THE DEADLINE
for entries in the
Hughes, McCall, Westinghouse, General Electric, and Matthews Valor Awards

FEBRUARY 15, 1954, IS THE DEADLINE
for entries in the
Martin, Watts, and Planned Lighting Awards

Remember to send in your entries, keeping in mind the new advantageous terms and conditions in several of these contests, so that you can be in the winners' circle when the presentations of these coveted awards are made.

EDISON ELECTRIC INSTITUTE
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The Outlook for Power

(*Continued from page 6*)

in American business? After all, business capital is provided by the savings of people. Is the particular company sterilizing the savings of its employees in its pension plan by investing exclusively in debt securities?

Efforts among companies vary greatly in both planning and motivating the organization. Do your methods pick up which companies are doing the best job? The answers have an important bearing on the outlook.

Management's Tools

So much for the human side of the business. How about the tools with which the managers are equipped to do their jobs? Larry Appley, President of the American Management Association, has reduced the basic functions of management to two: planning and control. Maybe this is an over simplification, but it will do for now.

How good are the company's tools of planning? Does it have modern, continuous expense budgeting techniques? How good is its forecasting function? Does it have good economists on its staff or available on retainer?

How about its capital budgeting and planning? Does it utilize modern, continuous budgeting practices here as well? Does it use modern functional or responsibility accounting for both budgeting and reporting? Is the accounting done for regulatory commissions alone, or is it a living, dynamic tool for management?

How well does the company require people to measure regularly their performance and results in their specific areas of responsibility? Does the company, in addition to its usual subjective measures of comparison with budget and with prior periods, also utilize objective measures of its performance against others in the industry and other industries?

Is measured performance practiced at both the top and the bottom of the organization? How about performance analysis? Does an executive or manager give an account regularly of how well or how poorly the areas of his responsibility were carried out? And does he submit plans for the correction of the soft spots as soon as they show up?

How about expense measures? Profit is the difference between selling price and cost. In the analysis of the company's performance, is too much attention given to selling price rather than expense?

How about building for the future? In addition to a company's human resources, its organization, and its management techniques, one needs to look also at how well it is building otherwise for the future.

What of its physical plant? How well is it maintained? Is the company skimping on maintenance to show earnings today at the expense of tomorrow? How about its system planning? Its standards of construction? Its reserve policies?

How aggressive is its sales promotion program? What are its activities in the field of area development? How well has it built diversity of industry in its area? Does its area have new, modern industrial plants or obsolete high-cost ones?

These facts all have a bearing on the red-hot question of the day: "How well will the company fare if there is a 10 or 20 or X per cent drop in industrial activity in the country?"

How much of an investment has and is the company making in advertising? How about its investment in public relations? Will it be able to sell the public on rate increases when the going is tough? How sound is the company's reputation with its regulatory commissions? How about the company's participation in efforts to bring about sound legislation in tax, regulatory, and other fields?

Statistics Aren't Enough

I could go on, but I think the point has been made that in any appraisal of the outlook for a particular company in this great industry, with its great future, many factors of a non-statistical nature need a look.

Statistics are important, certainly. But they alone aren't enough. Debt ratio and depreciation accrual rates and dividend pay-outs are important. But they tell largely what happened yesterday, not what's going to happen tomorrow.

The future of the electric industry will be determined by people. The kind of managers they are, the kind of motivation they get, the tools they use, and the foundation they have to build on—these will determine how well our industry will make out. The potential outlook for power, I repeat, is big. It is truly enormous.

You analysts represent the owners of our companies and our industry. You will have an important say in whether or not we get our required capital for expansion and at what cost. So you have an important influence on the outlook for power. How good a share of the outlook a particular company will get is dependent very largely upon factors not easily measured by the conventional tools of the analysts.

We whom you have hired to manage your enterprises are ready—or should be—to provide you the missing information you need to appraise our prospects, for the extent of your information is important both *to* us and *for* us.

Wisconsin Utilities Donate A-C Calculator

AN A-C Network Calculator, valued at $240,000 completely installed, has been given to the University of Wisconsin by the Wisconsin Utilities Association.

In addition, a group of association companies, including Wisconsin Electric Power Co., Wisconsin Public Service Corp., Wisconsin Power and Light Co., Madison Gas and Electric Co., Northern States Power Co. of Wisconsin, and Lake Superior District Power Co., along with Allis-Chalmers Manufacturing Co. have agreed to underwrite the cost of the calculator's use and operation over a 20-year period.

The machine, made by Westinghouse Electric Corp., will be one of 48 in the world, 34 of which have been installed in the United States, mostly in universities. The only one of its kind in Wisconsin, it will be available to engineering students and research workers, to members of the Wisconsin Utilities Association, and to all public utilities and industries in the state for studies of electrical systems.

Use of the machine will be guided by an advisory committee drawn from Wisconsin Utilities Association members and representatives of the university's College of Engineering.

Fifteen EEI Resuscitation Medals Authorized for Presentation to Company Personnel in '53

New Medal Symbolizes Life-Giving Power Transmitted Through Hands of Rescuer

THE EEI Medal was authorized in 1933 to encourage use of approved resuscitation techniques and to honor electric company employees whose application of them saves human life in cases involving electric shock.

The medal has recently been redesigned, as shown in the adjoining cut. In addition, a small folder commenting on the history and significance of the award has been prepared for inclusion in the medal box. The folder reads, in part, as follows:

"Vesting the award with sentimental and historical value to the industry, copper from the world's first underground electric light and power distribution system, laid in New York City by Thomas A. Edison and placed in operation in 1882, has been incorporated in the medal's composition.

"The medal is symbolic of the life-giving power that can be transmitted through the hands of an employee performing resuscitation to a co-worker felled by electric shock. This symbolism received eloquent expression in the title of a study of EEI resuscitation case histories, 'By the Grace of God, Through the Hands of a Fellow Worker,' prepared by W. R. Smith, for many years a leader in the field of accident prevention.

"The phrase, 'By the Grace of God, Through the Hands of a Fellow Worker,' has, therefore, been translated as *Gratia Dei per Manus Socii in Opere* on the face of the Medal, in keeping with the classical traditions which give high place to devotion to duty, selflessness, and preparedness through training, the foundations of man's greatest privilege—the saving of life."

The award is available to employees of operating electric companies in the United States, including nonmembers of the Institute. In 1953, 15 medals were authorized for presentation, bringing the total number of medals authorized since 1933 to over 370.

In cases of electric shock where several people perform resuscitation, an EEI Medal is awarded to the employee rendering the most conspicuous performance and an EEI Medal Miniature to each additional employee who applies resuscitation. If it cannot be determined whose performance is most conspicuous, an EEI Medal Miniature is awarded to every employee who applies resuscitation. The medal miniature is in the form of a lapel button.

Edison Electric Institute Medal

Where an employee becomes eligible for a second EEI Medal, a bar is authorized for attachment to the medal awarded for the initial case of resuscitation. Certificates signed by the Institute President accompany each medal, medal miniature, and bar.

Employees giving outstanding assistance other than application of resuscitation are awarded Certificates of Assistance, bearing the signature of the Institute President and citing the service rendered.

EEI resuscitation awards are authorized for presentation throughout the year by the EEI Committee of Judges composed of Chairman R. H. Coleman, Consolidated Gas Electric Light and Power Co. of Baltimore; E. C. Rue, Boston Edison Co.; and I. R. Dohr, Consumers Power Co.

Brief statements on 12 of the 1953 awards follow. These accident case histories demonstrate how teamwork, quick thinking, and courage can be united to avert tragedy. They illustrate with dramatic impact the effectiveness of company safety training programs and the valor of company personnel. They also emphasize, however, how momentary departures from company safety rules can cause needless suffering—and loss of life.

Additional statements on the 1953 awards will appear in the BULLETIN as they become available.

AUGUST D. MEIFERT

Pennsylvania Electric Company

A severe wind storm swept through Spruce Creek Valley, Pa., on July 6, 1953, and the following morning a crew of the Pennsylvania Electric Co. was assigned to replace a tap-line pole broken by a falling limb. At the job site in Colerain Park, Linemen August D. Meifert and Russell J. Brumbaugh climbed an adjacent junction pole on which was located a transformer. Brumbaugh first removed the risers feeding the transformer, thereby de-energizing everything on the pole except three main feeder wires located on a top set of double arms. He and Meifert then pulled the pins in the deadends on the tap lines, dropping the wires to the ground.

The two men were preparing to come down the pole when Brumbaugh, for some unknown reason, stood straight up, his head contacting a 7.2-kv phase wire. An arc flashed, and he remained in electrical contact until Meifert pulled him away from the wire. Brumbaugh was unconscious and not breathing, and within a few seconds after the accident occurred, Meifert had begun to resuscitate him by the pole-top method.

After about ten minutes of treatment, Brumbaugh showed signs of life. In the meantime, Foreman Phil D. Hoffman had climbed the pole, and he and Meifert lowered the injured man to the ground with the help of Apprentice Lineman Simon J. Edwards. Brumbaugh was still unable to breathe without assistance, and Meifert, Hoffman and Edwards administered Holger-Nielson and Schafer Prone-Pressure artificial respiration for another half hour. Upon arrival of an ambulance. the victim was taken to a hospital for treatment of burns. He was away from work for two months but suffered no permanent disability.

August D. Meifert received an EEI Medal and Phil D. Hoffman and Simon J. Edwards EEI Medal Miniatures at a testimonial dinner held at the Waterstreet Inn on October 8. 1953. The presentations were made by Penelec Vice President William H. Wade in the presence of Russell J. Brumbaugh, whose life had been saved. A lengthy feature story on the presentation ceremonies appeared in a local newspaper.

EEI Medal winner A. D. MEIFERT (third from right), Pennsylvania Electric Co., displays his award. Left to right are Safety Director E. J. Miller; R. J. Brumbaugh, whose life was saved; EEI Medal Miniature winner S. J. EDWARDS; Vice President William Wade; Meifert; medal miniature winner P. D. HOFFMAN; and Huntington Manager L. D. Brandt.

JOHN P. SCHNEIDER

Pennsylvania Power & Light Company

In connection with the maintenance duties which his crew was performing, Lineman William Geib was working atop a pole near Kirkwood. Pa., on the afternoon of September 30, 1952. His bare right hand was in contact with a bare system neutral when, as he was hooking a metal snatch block around a pin normally carrying the middle phase wire of a 12-kv line, his left hand contacted the energized end of a 12-in. hot-line tool circuit breaker which previously had been attached to the middle phase of that line.

An arc roared and Geib, unconscious and not breathing, slid down the pole to a point about 15 ft above the ground where his body belt stopped his descent. Lineman John P. Schneider immediately climbed up the pole under the injured man and began pole-top resuscitation. Lineman Roy G. Sweger followed Schneider up the pole, removed the victim's hooks, and assisted in belting the unconscious man down to the ground.

There, Line Foreman John M. Good, Truck Driver Earl Greenawalt, and Truck Driver Ray Lynes alternated in applying supplementary Holger-Nielson treatment prior to Geib's removal to a hospital. In addition, Schafer Prone Pressure was administered at the accident scene while bandages were applied to Geib's second degree burns.

John P. Schneider was presented an EEI Medal and Medal Miniatures were awarded to John M. Good, Earl Greenawalt. Ray Lynes, and Roy G. Sweger for their successful resuscitation of Lineman Geib. The awards were made at a special ceremony at Rhoad's Spanish Tavern in March, 1953. Harry Ferguson, Vice President of Pennsylvania Power & Light's Operating Department, made the presentations. Stories of the rescue and award ceremony appeared in the *Lancaster Intelligencer-Journal* and *Lancaster New Era* on March 7.

JOHN G. LINDSAY

Philadelphia Electric Company

On the morning of November 14, 1952, a Philadelphia Electric Co. construction crew was equipping a new 4-kv circuit at the company's Morrisville Substation in Morrisville, Pa.

Electrical Mechanics, First Class, William J. Niedurny and Robert Wild were on a scaffold installing a temporary safety barrier around a 4-kv disconnect to isolate hot hanging blades when Wild felt the scaffold shake. Turning, he saw Niedurny falling to the floor of the substation and started climbing down to aid him.

Electrical Mechanic. Third Class, Sigmund A. Proca heard a crashing noise and, upon investigation, found Niedurny lying on the floor between two ladders. As Sub-Foreman John G. Lindsay rushed over. Proca pulled Niedurny, unconscious and not breathing, from between the ladders. Within one minute after the injured man fell, Proca had positioned him for resuscitation, Lindsay had started prone-pressure artificial respiration, and Wild had telephoned for an ambulance.

Niedurny showed signs of life in about five or six minutes, but resuscitation was continued for another minute or two until the ambulance arrived to take him to a hospital. After being treated for burns, Niedurny was released, losing no time

JOHN P. SCHNEIDER (third from right), flanker by co-workers who received EEI Medal Miniatures, is congratulated for winning an EEI Medal by Harry Ferguson, Vice President of Pennsylvania Power & Light Co. Left to right are JOHN M. GOOD, ROY SWEGER, Vice President Ferguson, Schneider, RAY LYNES, and EARL GREENAWALT.

from work as a result of the accident. Subsequent investigation indicated that he apparently had contacted a 4-kv circuit with his head.

John G. Lindsay was presented an EEI Medal and Sigmund A. Proca and Robert Wild Certificates of Assistance by K. M. Irwin, Vice President of Philadelphia Electric Co. Stories of the rescue and award ceremony appeared in the March 20, 1953, issues of the *Philadelphia Daily News*, *The Evening Bulletin*, and *The Philadelphia Inquirer*.

EEI Medal winner JOHN G. LINDSAY (second from right) shakes hands with K. M. Irwin, Vice President of Philadelphia Electric Co., as Certificate of Assistance winners SIGMUND A. PROCA (left) and ROBERT WILD (right) stand by.

BOYCE H. THRIFT

Florida Power Corporation

On the cloudy, windy morning of January 23, 1953, a Florida Power Corp. crew continued the previous day's work of removing six city blocks of an old overhead ground wire, one span at a time, in Clearwater, Fla.

Groundman Francis W. Paynter was standing with his hand on the winch of a semi-trailer, while the crew was lowering a span of old ground wire. Suddenly the span simultaneously hit a 2.4-kv jumper to a branch line and fell across the top of the semi-trailer, energizing it. Crew members yelled for everyone to stand clear of the trailer and to pull up the wire. Paynter, receiving the current through the trailer winch, could not let go until the wire was raised. When contact was broken, he fell to the ground, unconscious and not breathing.

Line Foreman John J. Heitz, nearest the victim, turned him over and started administering prone-pressure about ten seconds after the shock. Lineman Boyce H. Thrift relieved him, and Paynter resumed breathing after about one minute of treatment. Lineman Alton R. Chapman, after covering Paynter with coats and a blanket, relieved Thrift for a short time while Heitz telephoned for an ambulance. Thrift took over resuscitation again, continuing until the ambulance arrived and, in the ambulance, until reaching the hospital. In all, artificial respiration was administered by both the Schafer and Holger-Nielson methods for about 15 or 20 minutes. Paynter was treated for minor burns on his fingers and was placed in an oxygen tent, being released from the hospital the same day. He lost no time from work.

Boyce H. Thrift received an EEI Medal and Alton R. Chapman (by proxy) and John J. Heitz medal miniatures from W. J. Clapp, President, Florida Power Corp., on July 10, 1953, at an outing for Clearwater Division employees. Thrift also received $500 in company stock. Mr. Chapman previously received an EEI Medal in 1951 for resuscitating a coworker. Stories of the rescue and award presentations were run in the July, 1953, issue of *Power Lines*, company employee publication, and the July 14, 1953, issue of the *Clearwater Sun*.

CHARLES N. THOMPSON

Kansas Gas and Electric Company

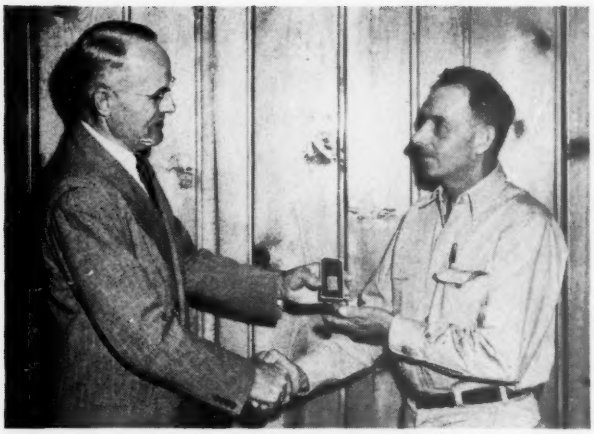
On January 19, 1953, a crew directed by Substation Foreman Charles N. Thompson was replacing an oil circuit breaker in Leon Substation, Leon, Kans. As the new circuit breaker was being moved into place, Thompson heard a scraping noise and told his crew to stop work. Groundman Ray R. Russell then climbed a ladder to look at the top of the switch to see whether or not anything was obstructing its passage. Russell's hand was grasping a metal leg of the substation structure when his head came in contact with a live 12-kv conductor. An arc resounded throughout the substation, and he fell to the ground.

Russell was unconscious and not breathing. Though hampered by lack of space within the substation structure, Thompson immediately applied prone-pressure artificial respiration, and after about three minutes of treatment, the injured groundman began to breathe. Russell's first breaths were deep and irregular, and resuscitation was continued for about 15 minutes more until an ambulance arrived. In the meantime, other members of the crew placed a blanket under the groundman and jackets under his head and chest.

Russell was then taken to a hospital, where he was treated for severe head burns and burns on the left hand necessitating amputation of his index finger. He was away from work for three months.

An EEI Medal for successful resuscitation was presented to Charles N. Thompson by M. F. Gill, President of Kansas Gas and Electric Co., in ceremo-

BOYCE H. THRIFT (third from left) holds his EEI Medal Certificate. Left to right are J. J. HEITZ, winner of an EEI Medal Miniature; A. E. Lane, who accepted a medal miniature for absent ALTON R. CHAPMAN; Thrift; W. J. Clapp, President of Florida Power Corp.; Division Manager D. B. Aide; and Safety Director H. B. McMahan.



CHARLES N. THOMPSON (right) receives his EEI Medal and congratulations from Murray F. Gill, President of Kansas Gas and Electric Co., for the resuscitation of a co-worker.

R. J. RYAN (right) accepts an EEI Medal from the man whose life he saved, Donald E. Cantrell. T. E. Roach, President of Idaho Power Co., stands at left.

nies held at the company's service building on August 17, 1953. Other company officials attending were G. W. Evans, Vice President and General Manager; Frank Barr, Vice President; S. J. Sickel, General Line Superintendent; and R. H. McAdams, Safety Director. Stories on the rescue and presentation appeared in the *Potwin Ledger* and *Burns (Kansas) News* on August 27, 1953.

R. J. RYAN

Idaho Power Company

So that their elevating-platform truck could move to new transmission lines, Linemen Donald E. Cantrell and R. J. Ryan were lifting secondary conductors which crossed the Meridian-Kuna highway. The date was December 2, 1952.

As Cantrell was sliding 220-v secondary conductors over the platform of the truck, a 7.2-kv conductor, which was bouncing vertically from the movement of the secondary conductors, hit him on his back. The bare neutral of the secondary was in contact with the metal platform of the truck, providing a path for the primary current to the ground.

Cantrell was rendered unconscious and he fell clear of the circuit landing on his back on the truck platform. Ryan immediately turned him over and began to administer Schafer Prone Pressure.

After about three minutes of treatment, the victim regained consciousness and was able, with help, to descend the ladder. He was hospitalized for one week for treatment of burns which he suffered in the accident.

For his prompt and efficient resuscitation action, R. J. Ryan was awarded the EEI Medal at a special ceremony held in February at the company's local Boise office. T. E. Roach, President of Idaho Power, made the presentation, which was publicized in the *Idaho Daily Statesman*.

WILLIS C. ROOT

Ohio Edison Company

On the morning of July 28, 1953, Lineman William C. Nethero and Willis C. Root were working atop a pole near Loudonville, Ohio, to install three-shot repeating fuses cutouts on a 2400/4160-v three-phase line. The north cutout had been energized and the jumper removed, and the two workmen had connected the south cutout to the line and were preparing to install the fuse cartridges.

As Netherto reached between the cutout hanger arm and kicker arm to get the first cartridge from Root, he slipped and contacted the south cutout with his left arm and the 34.5-kv grounded air-break operating rod with his right leg. He was rendered unconscious, and his breathing stopped.

Upon hearing the noise of the arc, Root immediately swung around the pole behind Nethero and began to administer the Oesterreich Method of Pole-Top Resuscitation. While Truck Driver James E. Rogers radioed for an ambulance, Crew Foreman Kenneth E. Martin scaled the pole and tied a line to the victim so that he could be lowered to the ground.

Root continued pole-top method application until Groundman W. B. Utsinger, Lineman Robert R. Rieck, and Rogers could lower Nethero. On the ground, Nethero, still not breathing, was given Schafer Prone Pressure by Rogers. Although the victim regained consciousness after about five minutes, Martin accompanied him in the ambulance and administered artificial respiration until arrival at the hospital where Nethero was treated for burns. He was away from work three days.

Of the incident, Nethero later said, "The fact that I am alive today testifies to the outstanding ability and team work of the members of my crew."

Recognition of their successful resuscitation efforts was made through the awarding of the EEI Medal to Willis C. Root, Medal Miniatures to Kenneth E. Martin and James E. Rogers, and Certificates of Assistance to W. B. Utsinger and Robert R. Rieck. The awards were presented by Wilbur M. LaSalle, Ohio Edison Manager, at a banquet held at the Triangle Gardens in Ashland on November 19, 1953. A story concerning the presentation banquet appeared in the *Ashland Times-Gazette*, November 20, 1953.

While EEI Medal winner WILLIS C. ROOT (second from left) looks on, KENNETH E. MARTIN (left) accepts an EEI Medal Miniature from Ohio Edison Manager W. M. LaSalle for helping Willis rescue William Nethero (second from right).

WALTER F. PODLES

Worcester County Electric Company

Welcome Mowry, Jr., was repairing a pump at his gasoline service station in Douglas, Mass., on July 31, 1953. Nearby, a Worcester County Electric crew was making a routine change-over from an old pole to a new one.

Mowry dropped the plug for the priming hole of the pump, and reached down into the hand hole beneath the pump to retrieve the lost plug. Suddenly Wayne Cass, who was working with Mowry in repairing the pump, found Mowry unconscious and not breathing. He called to one of the electric company crew, Lineman Walter F. Podles, and asked what was the matter with Mowry.

Finding Mowry lying prone on the ground with his right arm in the hand hole beneath the gas pump, Podles noticed a bare wire, protruding from a junction box, in contact with Mowry's neck, while Mowry's cheek was against the pump.

Podles grabbed him around the waist, lifted him clear of electrical contact, and started Schafer Prone-Pressure artificial respiration. Podles continued resuscitation for about ten minutes until Mowry began to breathe; however, Mowry again stopped breathing momentarily, and treatment had to be continued for about ten more minutes until he regained consciousness. Mowry was hospitalized overnight for treatment of burns and released the next morning.

Walter F. Podles had the distinction of being the first electric company employee to receive the redesigned EEI Medal. The award was presented to him at dinner held in his honor at Uxbridge Inn, Uxbridge, Mass., on November 12, 1953, by Hugh F. Lovering, Assistant Safety Manager. Present to extend congratulations were Welcome Mowry, Jr., whose life had been saved, Vice President Ralph E. Secord, Assistant Vice President Orie Van Rye, who presided at the dinner, Uxbridge Manager Frank E. Powers, Superintendent of Distribution Lester P. Cramb, and fellow workers and guests from Worcester and Boston.

EEI Medal winner W. F. PODLES stands at center flanked (left to right) by Uxbridge Manager F. E. Powers, System Assistant Safety Manager Hugh Lovering. W. Mowry, whose life was saved, and Assistant Vice President Orie Van Rye.

Stories on the rescue and award appeared in the *Blackstone Valley News Tribune* on November 11; *Worcester Telegram* and *Evening Gazette* on November 12; and on November 13 in the *Worcester Telegram, Evening Gazette, Woonsocket Call,* and *Uxbridge Times.* A feature on the presentation also appeared in the December issue of *Contact*, system employee magazine.

JAMES G. COVELLI

Ohio Edison Company

Lineman Arthur W. Boozer and James G. Covelli were members of an Ohio Edison line crew employing a truck-mounted derrick to set a pole between a 7-kv circuit, 3-phase primary near Kent, Ohio, on April 8, 1952.

When the slack in the winch line on the derrick was taken up and the pole began to move, Boozer walked around the truck to inspect the winch drum. At that time, the winch line got tangled around a crossarm, on which the pole was resting, causing the derrick to touch a phase wire and energized the truck. As Boozer leaned around the rear corner of the vehicle, he lost balance and touched it.

Covelli, standing nearby at the butt end of the pole, saw Boozer fall and looked up to see a flash from the derrick head to the road phase. He immediately went to Boozer, who was unconscious and not breathing, and started prone-pressure resuscitation.

Artificial respiration was continued for about four minutes, although Boozer started breathing approximately three minutes after it was started. A doctor was on the scene within a few minutes after Boozer was revived, and the injured man was moved to his office to be treated for third-degree burns. Boozer lost no time from work because of the accident.

James G. Covelli was presented an EEI Medal by Samuel Stites, Vice President and Manager of the Akron Division, Ohio Edison Co., at an annual service award dinner for the Akron Division and General Office held in Akron, Ohio, May 6, 1953. Stories of the rescue and award ceremony appeared in the June, 1953,

JAMES G. COVELLI (right), winner of an EEI Medal for rescuing a fellow worker, is congratulated by Samuel Stites, Vice President and Akron Division Manager, Ohio Edison Co.

C. S. SASSER (left) displays the certificate accompanying the EEI Medal presented him by H. M. Leaman, Whiteville Manager, Carolina Power & Light Co., at right.

GEORGE M. BARRY (left) smiles as S. R. Knapp, President of The Connecticut Light & Power Co., pins an EEI Medal on his lapel at a company safety rally.

Certificate of Assistance winners J. P. DONAHUE (l.) and P. J. BIESECKER (r.) flank EEI Medal winner W. P. FREAS (second from r.) and Philadelphia Electric Vice President R. P. Liversidge.

issue of *The Ohio Edisonian*, company employee magazine, and the May 10, 1953, *Akron Beacon Journal* and Kent-Ravenna *Record-Courier-Tribune*.

C. S. SASSER

Carolina Power & Light Company

Following a storm on the night of June 22, 1952, Groundman Graham Jackson and Lineman C. S. Sasser were working to restore electric service to the area of Wananish, N. C. Preparing to refuse a transformer, Jackson climbed a pole owned jointly by Carolina Power & Light and Carolina Telephone and Telegraph in order to reach a cutout block. Unable to reach the cutout with a switch stick, he climbed higher, and his shoulder came in contact with a telephone conductor.

Jackson was immediately rendered unconscious and knocked from the pole. Unknown to him, a 2.3-kv primary conductor was lying across the telephone wire several spans away.

Sasser, standing on the ground near the pole, quickly turned Jackson on his stomach and began prone-pressure artificial respiration. Following about five minutes of treatment, the victim was breathing well enough for Sasser to run to the line truck and radio for an ambulance. Upon his return, Sasser continued artificial respiration until Jackson was in condition to be removed to a hospital where he was treated for severe burns.

C. S. Sasser was awarded an EEI Medal for his successful resuscitation of his fellow worker. H. M. Leaman, CP&L's Whiteville Manager, made the presentation at a dinner at which employees of the Whiteville and Elizabethtown Divisions and their wives were guests. A story of the award appeared in the November, 1953, issue of *Spotlight*, company employee magazine.

GEORGE M. BARRY

The Connecticut Light & Power Company

On the morning of August 6, 1953, Joseph H. Lizotte was standing in the bucket of a raised skylift platform clearing branches on a 4800-v distribution line in Kensington, Conn. In pulling lose a limb he had cut, Lizotte contacted the wire with his right hand while apparently his left arm touched another branch, completing the circuit. Lizotte cried out and slipped unconscious and not breathing in the bucket.

Lineman George M. Barry, who was sitting in his radio-equipped truck about 300 feet away, was engaged in conversation with Trimming Foreman Canio J. Basile when they heard Lizotte's cry. Barry immediately directed his truck toward the scene of the accident and simultaneously radioed for an ambulance.

Before either man could reach him, the victim slipped out of the bucket and fell about 20 feet to the ground. Telephone wires and the side boxes of the truck broke his fall.

When he reached Lizotte, Barry promptly began Schafer Prone-Pressure artificial respiration, and after four or five minutes of treatment Lizotte began to gasp for breath. Basile then relieved Barry, while Barry cleared the victim's mouth and checked his tongue.

Again Barry resumed resuscitation and continued until Lizotte's breathing became more steady and normal. In the meantime, Assistant Engineer Thomas F. Keena, who had picked up Barry's radio call, arrived at the scene, loosened Lizotte's clothing, and then massaged his legs to help restore circulation.

Lizotte was hospitalized for treatment of second and third degree burns suffered in the accident and was away from work about a month.

George M. Barry was awarded an EEI Medal for his prompt and efficient action. For their parts in the resuscitation effort, Canio J. Basile received a Medal Miniature, and Thomas F. Keena received a Certificate of Assistance. The presentations were made on November 30, 1953, by Sherman R. Knapp, President of The Connecticut Light & Power Co., at a rally presided over by Paul V. Hayden, Vice President of Public and Employee Relations. The rally was held in the CL&P auditorium at Berlin and was attended by approximately 300 operating employees.

WILFRID PEARSON FREAS

Philadelphia Electric Company

As a result of storm damage, crews of the Philadelphia Electric Co. were out before dawn on the rain-swept morning of May 26, 1953, working in the vicinity of Jeffersonville, Pa. On a pole at Ridge Pike and Liberty Ave., Troubleman Edward Walter Meder had just closed a street-light transformer cutout box and was descending. As he made his way down the pole, one of his climbers struck a knot, and he was thrown toward the energized street-light wire. In order to avoid bodily contact with the wire, he grabbed it with his gloved left hand.

Lineman Wilfrid Pearson Freas, on the ground, heard the troubleman scream. Looking up, Freas saw his coworker shake himself free of electrical contact and then collapse in his safety belt. Meder had received electric shock when he grabbed the street-light wire because of holes in his rubber glove.

Freas immediately sent out a call for help over the truck radio. He then climbed up the pole under the injured man, who was unconscious and not breathing, and began to administer resuscitation by the Oesterreich Pole-Top Method. Working a mile away, Lineman Preston Biesecker, Jr., and Troubleman Joseph P. Donahue, Jr., heard Freas' radio message and hurried to the scene of the accident.

After about two minutes of resuscitation, Meder began to moan. At the same time Biesecker and Donahue drove up. Treatment was continued for about two more minutes, and Biesecker climbed the pole, taking with him a line with which he, Freas, and Donahue lowered the victim. Donahue carried Meder to the truck and drove him to a hospital. Biesecker accompanied the injured man, giving him prone pressure to assist his breathig. Meder was away from work for five days and suffered no permanent disability.

Wilfrid Pearson Freas received an EEI Medal and Preston Biesecker and Joseph Donahue Certificates of Assistance in the office of Vice President Robert P. Liversidge, Philadelphia Electric Co., before 15 executives and department heads of the company on September 15, 1953. Mr. Liversidge made the presentations. A story on the awards appeared in the Norristown, Pa., *Times Herald*, on the following day.

Financing and Investor Relations Committee Meeting

R. N. Benjamin, *Chairman*

THE first full meeting of the Financing and Investor Relations Committee since its reactivation in January, 1952, was held at EEI headquarters in New York, N. Y., on Dec. 9, 1953, with Chairman R. N. Benjamin presiding. About 30 committee members or their representatives participated in the well-planned and interesting meeting.

Guest Speakers

The morning session was devoted to the presentations of two guests. Speaking on "Availability of Insurance Funds for Investment in 1954," Arnold R. LaForce, Second Vice President of Metropolitan Life Insurance Co., dealt primarily with the character and structure of life insurance investments and their importance in the past and in the future. Harold H. Young, Partner of Eastman, Dillon & Co., discussed common stock financing in a talk entitled "The Outlook for Financing of the Electric Industry in 1954." Active discussion from the floor followed both reports.

In the afternoon W. F. Stanley spoke on "Stock Dividends, Stock Splits, and Dividend Payout." Committee Vice Chairman W. J. Rose led a discussion on "Ways and Means for the Utility Industry to Meet Financing Problems in 1954," indicating a favorable outlook for the coming year and suggesting that efforts be made to avoid conflict of dates in the timing of securities offerings. Following, H. A. Busch conducted a discussion of "Improvement of Investor Relations," based upon the experience of his own company.

Mr. Benjamin concluded the meeting by asking for committee suggestions on discussion topics for the next meeting, stating that a report on employee stock pension plans would be completed before that time.

Prime Movers Committee Meeting

W. L. Chadwick, *Chairman*

THE Prime Movers Committee convened at the Hotel Astor, New York, N. Y., on Nov. 30 and Dec. 1, 1953, in conjunction with the annual meeting of the American Society of Mechanical Engineers. Approximately 100 persons participated in the activities of the committee's 79th meeting, which welcomed R. N. Benjamin, G. C. Laughlin, V. L. Stone, and W. Welch, Jr., who had joined the committee since its October meeting.

The sessions were highlighted by the reports of subcommittee chairmen on the progress and status of projects and subjects with which the committee is concerned. The committee sponsors 16 subcommittees—some considering subjects as specific as certain power station equipment and others following topics of such wide general interest to power engineers as atomic energy. Over 60 electric companies from all parts of the country are represented on these subcommittees.

The increasing public attention being given to the problem of stack emission because of recent atmospheric contamination in large metropolitan areas was emphasized by the report of the Air Pollution Subcommittee. G. V. Williamson, Chairman of this group, advised the committee of meteorological conditions contributing to the "smaze" experienced during November, 1953, in New York City. Further discussion detailed research projects such as wind tunnel tests for stack design that are being undertaken by various companies to preclude air contamination.

Fly Ash Disposition

With mechanical and electrical dust collectors removing the fly ash from stack gases, the problem of fly ash disposition is of considerable interest to power generating companies. Reports from several members indicated economical methods of disposal—some administered by the sales organizations of the companies and others developed by brokers. Because of increased revenue from bagged fly ash, one company reported that the installation of a bagging plant has been justified. A review of fly ash consumers brought out that the material is now being used on turnpike shoulders and as an admixture for a high-temperature concrete for jet plane runways. One company reported using fly ash in a concrete structure at a considerable economic saving, while others have shipped the material more than a thousand miles for use in concrete dams.

Use of Gas-Turbine Prime Movers

The committee noted with interest the increasing use of gas-turbine prime movers. The Gas Turbine Subcommittee, under the chairmanship of C. W. E. Clarke, reported that the performance and reliability of the first and second gas-turbine units in the utility industry (placed in service during 1949 and 1952) have proven satisfactory. The subcommittee also reported on the operation and maintenance requirements of several other utility installations. Mr. Clarke pointed out that extensive tests are being undertaken on an electric company machine by one gas-turbine manufacturer seeking correction of certain difficulties encountered in the use of low-grade fuel oils. The subcommittee's report included a resume of gas-turbine orders placed with several American manufacturers.

The committee also approved a report from a special subcommittee on feed-water research consisting of F. W. Argue, S. T. Powell, and V. F. Estcourt and adopted a resolution recommending to the Research Projects Committee some basic research into the causes of iron-oxide formation in high-pressure, high-temperature boilers with a view to its control.

R. W. Parkinson, Chairman of the Boilers and Combustion Subcommittee, reviewed a project under consideration by ASME to extend the existing tables on the thermal properties of steam. After discussion, the committee approved the recommendation of Mr. Parkinson's group and unanimously went on record as favoring the proposed ASME action. The Boilers

and Combustion Subcommittee will advise the committee of developments regarding this project.

The Metallurgy and Piping Subcommittee reported that graphitization continues to constitute a problem in power-plant operation. This subcommittee, under the chairmanship of E. H. Krieg, presented a discussion by H. Knecht of a recent graphitization failure in large steam piping. The committee was also informed of a case of graphitization occurring in cast-steel valves in another station's main steam lines.

A Prime Movers Award Subcommittee, consisting of J. N. Landis, Chairman, G. V. Williamson, R. M. Van Duzer, V. F. Estcourt and V. L. Stone, was appointed for the purpose of administering a Prime Movers Committee Award. This new award program is designed to recognize outstanding contributions to the literature of thermal electric station practice or equipment by individual or multiple authors. The award will be sponsored by Prime Movers Committee members and ex-members for presentation under the ASME Honors and Awards Procedure.

Start-up problems at several new stations were discussed, and experiences in a large number of operating and design problems were considered during a round table.

On the afternoon of the second day the Consolidated Edison Co. of New York, Inc., was host to committee members and guests at an inspection tour through the new Astoria Station, which included a valuable demonstration of that company's fire control training program.

Accounting Division Advisory and Executive Committees Meeting

W. D. Virtue, *Chairman*

THE first meeting of the Accounting Division Advisory and Executive Committees for the administrative year 1953-54 was held at the Edgewater Beach Hotel in Chicago last November 12-13. Some 30 members or their representatives were present.

W. D. Virtue, Chairman of the Accounting Division Executive Committee, pointed out at the meeting that the job of the division was to carry on work started by former committees, that a certain amount of continuity must be adhered to, as a great deal of committee activity represents work carried on from year to year. In speaking of committee service and its value, Mr. Virtue referred to an article in the October, 1953, BULLETIN, which stressed that "committee work is the foundation of trade association activity" and that "without hard-working committees staffed with earnest and dedicated members, no trade association can fulfill its obligation to function as a center for the assembly of information necessary to the advancement of the industry it serves."

Noting that substantial accounting progress had been made in the industry, Mr. Virtue commented that such matters as the uniform system of accounts, depreciation, electronic accounting equipment, taxation, and accelerated amortization continue to require intensive committee study. Mr. Virtue's remarks were followed by the reports of committee and executive subcommittee chairmen on work contemplated and status of work in progress.

Reports and Discussions

On November 13, W. G. Pilgrim, a guest from the Peoples Gas Light and Coke Co., gave a talk on "Economic Depreciation." A report of the Application of Accounting Principles Committee presented on the same day dealt mainly with developments in accelerated amortization.

C. J. Berner, Chairman of the Customer Relations Committee, reported on development of his committee's project on "Customer Relations Training—By Film-By Manual." Mr. Berner said the project, which should satisfy a long-felt need, would be available to the gas and electric industries in 1954.

Allan G. Mitchell, Chairman of the Subcommittee on a Proposed Accounting Award, reviewed factors affecting desirability of an accounting award and recommended a plan for an EEI Accounting Division Merit Award. It was agreed that the subcommittee's report be taken as a recommendation to be submitted to the EEI Board of Directors, and then to proceed along the lines of the subcommittee's recommendations.

There was also general discussion of various subjects including accelerated amortization, depreciation, reading meters at intervals greater than once a month and the effect on revenues and sales of appliances, and accounting for prior service pension costs.

Administrative Committee Makeup

The makeup of the administrative committees of the division was announced as follows:

The Advisory Committee is comprised of the five past Executive Committee chairmen headed by E. L. Cassady, immediate past Executive Committee chairman. The Editorial Committee is composed of all standing committee and executive subcommittee chairmen headed by O. K. Boyd, present Executive Committee Vice Chairman. The Conference Planning Committee is headed by Mr. Virtue and has as members the Executive Committee vice chairman, coordinators of the General Activities and Customer Activities Groups, and the EEI accounting director.

The Machine Exhibits Committee for the 1954 accounting conference is made up of the Executive Committee vice chairman and the EEI accounting director. The Organization and Procedure Committee is headed by the Executive Committee vice chairman, who will select members to serve with him. The Time and Place Committee for the 1955 accounting conference is composed of the Executive Committee vice chairman, coordinators of the General Activities and Customer Activities Groups, and the EEI accounting director, working in conjunction with comparable representatives of the AGA Accounting Section. The membership of the Nominating Committee is identical to that of the Advisory Committee.

Announcement was also made of the conference planning meeting held last December 7-8 to crystallize plans and the program for the 1954 accounting conference which will convene in Boston, Mass., April 12-14.

EEI PUBLICATIONS AND SERVICE MATERIAL

(Prices include transportation in U. S. only. Please order by number shown before title. Standing Orders may be placed for a specified number of copies of reports of various committees as issued, to be shipped to one address.)

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Simulated Federal Income Tax Return, 1947	1.00	1.00
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Statistical

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(Statistical Bulletins also available for years 1932 to 1943 inclusive) each.	.30	.75
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Engineering Committees

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52-14—Pitting Experiences of Hydraulic Turbines	.60	1.50
D-15—Penstocks (12/35)	1.00	2.50

JOINT REPORTS

51-19—Joint Use of Poles in Rural Areas, EEI-Bell Systems, 1951	No charge
51-16—Inductive Coordination Aspects of Power Factor Correction Capacitor Installations — Engineering Report No. 50 — Joint Subcommittee on Development & Research — EEI and Bell Telephone System—1951	.80 2.00
51-3—Recommended Standards for Distribution Transformers, Conventional Subway Type—1st Report, EEI-NEMA, 1951	.60 .60
R-9—Branch Circuit Overcurrent Protection for Low-Voltage Circuits of 30 Amperes or Less Used for Interior Wiring—Report of Joint Committee on Branch Circuit Protection of AEIC & EEI, 1949	1.00 1.00
R-6—Preferred Voltage Ratings for A-C Systems & Equipment, EEI-NEMA (1949)	.70 .90
Q-8—Single - Phase Motor Starting Current Rules, EEI-NEMA-AEIC, 1948	.25 .25
Q-4—Guide for Specification on Indoor Metalclad Switchgear, AEIC-EEI-NEMA, 1948	.25 .25
Q-3 — Standards for Distribution Transformers (Fourth Report), EEI-NEMA, 1948	.80 1.00
P-1—Mutual Assistance in General Emergency Situations Affecting both Power & Telephone Service—Report of Joint Subcommittee on Cooperation in Emergencies, EEI and Bell Telephone System	No charge
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H-3—Inductive Coordination Aspects of Petersen Coil Grounding—Engr. Report No. 42—Joint Subcommittee on Development and Research (12/40)	.25 .65
F-17—Short - Circuiting Relay Protectors—Engr. Report No. 41—Joint Subcommittee on Development and Research (8/38)	.40 1.00

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53-10—Turbine Operating and Outage Data for 1951, 1953	.40	1.00
52-13—Metallurgy and Piping Report, 1952	.80	2.00
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51-5—Turbines, Condensers & Auxiliaries, Feedwater Heaters, Evaporators & Deaerators, 1949 (1951)	1.20	3.00
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50-13—Deposits on Gas Side of Steam Generating Units, 1951	.30	.75
50-10—Metallurgy and Piping Report, 1950	.90	2.25
50-1—Turbine & Condensers and Associated Equipment, 1948 (1950)	1.00	2.50
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Better Light Better Sight News (6 issues yearly)	1.00	1.00
Edison Electric Institute Bulletin (Monthly)	2.00	2.00
Farm Electrification (a bi-monthly publication) Up to 10 copies.....	Free	
Over 10 copies.....	.75	1.00
Quantity prices upon request.		
Home Service Exchange Yearly subscription	1.00	1.50
One free copy to members upon request.		

Personals

Paul V. Hayden, Director of Public Relations, The Connecticut Light & Power Co., has been elected Vice President in Charge of Public and Employee Relations. A 1925 graduate of Brown University, Mr. Hayden worked for Westinghouse Electric Corp. before joining CL&P in 1929 as industrial power engineer. In 1940 he was transferred to the company's Willimantic, Conn., office in the same capacity. In 1947 he was appointed engineer for special assignments with the sales staff in Waterbury, Conn., and was made industrial manager in 1948. He was named executive assistant in the Public Relations Department in 1950, becoming director of public relations later that year. Mr. Hayden is a member of the EEI Area Development Committee, secretary of the Connecticut Development Credit Corp., vice president of Connecticut River Watershed Council, Inc., and was a charter member of the Connecticut State Development Commission.

A. S. Jourdan has resigned as vice president of employee relations after completing more than 43 years of service with the company. First employed at Branford, Conn., in 1910 with the Housatonic Power Co., which was later merged into CL&P, he became manager there two years later. In following years he served as manager in Waterbury and New Britain, Conn., successively. He was appointed assistant to the vice president in Waterbury in 1925, manager at Meriden, Conn., in 1929, and division manager of the central division in 1939, his position until assuming his last post in 1952.

Marshall M. Koch, Vice President in Charge of Electric Operations, Public Service Co. of Colorado, has been elected President of the Rocky Mountain Electrical League, succeeding **H. Hugh Lenhart,** Vice President of Cheyenne Light, Fuel & Power Co.

Mr. Koch, after graduating in 1913 from Cornell University with a B.S. degree in mechanical engineering, was employed as a junior engineer with the Denver Gas & Electric Light Co., a predecessor of Public Service Co. of Colorado. He assumed general supervision of the Electric Distribution Department in 1921 and in 1947 was appointed assistant general superintendent of electric operations. He was elected to his present position with the company late in 1947 and became a director in 1948. He is a member of the American Institute of Electrical Engineers.

Elected as vice presidents of the Rocky Mountain Electrical League were **D. B. Hyer, Jr.,** Southern Colorado Power Co.; **J. A. Chapman,** Rawlins Electric Co.; and **L. A. Goalby,** Westinghouse Electric Corp., Denver.

W. A. Terry, Home Light & Power Co., Jasper, Minn., was named chairman of the League's Utility Division. **C. S. Stern** and **Harry Adler,** both of Arvada Electric Co., were re-elected treasurer and assistant treasurer, respectively.

James S. Hamilton, Manager for Virginia Electric and Power Co. at Portsmouth, Va., has been appointed Director of Rural Sales with headquarters in Richmond, Va. Named as his successor at Portsmouth is **G. Fred Cook, Jr.,** formerly Director of Vepco's Employee Information Program. Mr. Cook's replacement is **P. W. Smith,** formerly Director of Residential Sales.

Mr. Hamilton, an agricultural engineering graduate of Virginia Polytechnic Institute, was first employed by Vepco in 1931 and worked for ten years in rural electrification work before being called to active service with the Army Reserve Corps. In 1946 he returned to inactive duty as a lieutenant colonel and re-entered rural electrification work at Richmond for Vepco. In 1951 he was appointed manager at Fairfax and six months later as manager at Portsmouth.

Mr. Cook, a University of Richmond graduate, joined Vepco as an illuminating engineer, serving later as assistant to the district manager at Richmond. In 1932 he was made sales manager in Fredricksburg and subsequently moved to Suffolk in the same capacity. He was appointed sales manager at Portsmouth in 1939 and as manager at Virginia Beach in 1944. In 1951 he returned to Richmond as director of residential sales.

Mr. Smith has been with Vepco since 1935 when he joined it as an agricultural engineer in the Sales Department. Before being appointed director of residential sales in 1952, Mr. Smith was sales supervisor at Suffolk, South Boston, and Alexandria. He is a graduate of VPI.

William J. Jamieson has been appointed Director of Area Development of the General Public Utilities Corp. Engaged in industrial real estate activities for the past 17 years, he was manager of the Industrial Department of the C. B. Snyder Co. before joining GPU. Before that he was associated with the Garibaldi Realty Co. and served for six years in the Industrial Department of Public Service Electric and Gas Co. He is a member of the New York Metropolitan Real Estate Brokers Association and the Society of Industrial Realtors.

New England Electric System personnel changes have been announced as follows:

Elmer C. Stevens, the system's Lowell, Mass., Personnel Representative since 1950, has been named Personnel Director of electric companies in the Merrimac and Mystic Valley areas, having headquarters in Malden, Mass.

Clifford Hartley, Assistant Superintendent of Electrical Construction at New Engand Power Service Co., has been appointed Superintendent of Electrical Construction and will have headquarters in Worcester, Mass.

William J. Cadigan, Assistant Publications Director of New England Power Service Co. since 1950, has been named Publications Director. His headquarters are in Boston, Mass.

The formation of new departments and reorganization of existing ones at The Detroit Edison Co. have been announced.

Donald F. Kigar, Manager of Construction, has been appointed Manager of Union Relations in charge of the newly formed Union Relations Department. **Lynden J. Kaufmann,** Deputy Union Negotiator, has been made Director of Negotiations, and

John M. Maguire, who was Union Relations Adviser, has been named Director of Services for the department.

Sylvester F. Leahy, Director of Employee Relations, has been given the new title of Manager of Employee Relations but continues with his former duties. He is a member of the EEI Industrial Relations Committee. **Joseph M. Sullivan,** Employment Manager, and **Robert E. Schwab,** Personnel Planning Supervisor, have been made Assistant Managers of Employee Relations. **James L. Patton,** Employee Services Manager, and **Preston I. Amerman,** Assistant Employment Manager, have been named Director of Employee Services and Director of Employment, respectively, to work on Mr. Sullivan's staff. For Mr. Schwab's staff, **Robert L. Betts,** Wage Planning Supervisor, **Louis Duenweg,** Training Coordinator, and **John E. Sparling,** Personnel Research Supervisor, have been appointed Director of Wage and Salary Services, Director of Training Services, and Director of Employee Communications and Research, respectively.

For the newly created Civil Defense Department, **Harold B. Tyree,** former Assistant to the President, has been named Director. **Ernest W. Spring,** who will continue his duties as staff assistant in the company's electrical system, has been named Assistant Director of the department.

Realignment of the construction organization includes the appointment of **Henry E. Macomber,** Chief Engineer of Power Plants, to fill the post of Manager of Construction left vacant by Mr. Kigar's appointment. **Ronald E. Greene,** Construction Engineer, has been named Assistant Manager of Construction. In the Construction Department, renamed the Construction and Maintenance Department, **George J. Brown,** former Assistant Construction Engineer, has been appointed General Superintendent of the group, and **Lloyd J. McPartlin** has been made Assistant General Superintendent. The Engineering Division of the group, headed by Supervising Engineer **Simon Roth,** was transferred to the Manager of Engineering, **Howard P. Seelye.**

Among production posts filled, **Robert M. Van Duzer,** Assistant Chief Engineer of Power Plants, has been promoted to General Superintendent of Production with the responsibilities formerly held by the chief engineer of power plants. **Albert C. Pasini,** Superintendent of the new St. Clair Power Plant, has been named Assistant General Superintendent of Production. His former duties have been assumed by **George F. Campeau,** who was Superintendent of the Marysville Power Plant. He, in turn, has been succeeded at Marysville by **Clarence H. Clark. Stewart D. Hoetger** is Mr. Clark's assistant.

Also included in the company's organizational changes was the appointment of **Ernest V. Rieder,** Assistant to the Superintendent of the Trenton Channel Power Plant, to represent Production Superintendent Van Duzer in matters concerning the personnel organization, design, and construction of the River Rouge Power Plant.

J. S. Brown, Electrical Engineer, and **R. B. Horner,** Structural Engineer, both with Duquesne Light Co., have been appointed Chief Engineer and Chief Design Engineer, respectively.

After his discharge from the Navy in 1919, Mr. Brown served with various companies here and abroad before joining Duquesne Light in 1937. In 1945 he was named electrical station engineer and in 1951 was made electrical engineer. He is a member of PEA, AIEE, ASA, and the Pittsburgh Chamber of Commerce.

Mr. Horner, a 1916 graduate of the University of Pittsburgh with a B.S. degree in civil engineering, worked with a number of engineering companies before joining Duquesne Light in 1926 as an engineer. A year later he was named structural engineer, his position until his present assignment. Mr. Horner is a member of the American Society of Civil Engineers, Engineering Society of Western Pennsylvania, and American Concrete Institute.

Oliver Ramsaur, Assistant Communications Engineer, Pennsylvania Power & Light Co., has been named successor to retired **Charles S. Young,** Communications Engineer. Mr. Ramsaur first worked with Westinghouse Electric and Manufacturing Co. following his graduation with a degree in electrical engineering from North Carolina State College in 1920. In 1921 he moved to Carolina Power & Light Co. as draftsman-engineer and in 1923 joined PP&L in the Engineering Department. He served in several capacities before receiving his last appointment in July of this year. Author and co-author of several technical papers and magazine articles, he is a registered professional engineer in Pennsylvania and a member of the Engineers Club of the Lehigh Valley.

Mr. Young, a 1910 graduate of Yale University with a Ph.B. degree in electrical engineering, joined PP&L 35 years ago. He worked for the Fulton County Gas & Electric Co. upon graduation from Yale and later worked successively with Northern Indiana Gas & Electric Co., Pennsylvania Utilities Co., and Electric Bond and Share Co. before joining Lehigh Valley Light & Power, a predecessor company of Pennsylvania Power, in 1918 as electrical engineer. A series of promotions led to his appointment as communications engineer. He is a senior member of the Institute of Radio Engineers, a registered professional engineer in Pennsylvania, and has been chairman of the Middle Atlantic Utility Radio Association.

Dean C. Ober, Senior Vice President, The Cleveland Electric Illuminating Co., has retired after more than 40 years of service with the company. He first joined CEICO in 1912 as a part-time employee while attending Case Institute of Technology, becoming a permanent employee after graduating from Case in 1913 with a B.S. degree in electrical engineering. After five years as an electrical engineer he was advanced to assistant in charge of the Electrical Engineering Department in 1917. He was promoted to executive engineer in 1933, to vice president in 1944, to executive vice president in 1945, and to his last position early last year. Mr. Ober is a member of AIEE, Cleveland Engineering Society, and the Cleveland and Ohio Chambers of Commerce.

EDISON ELECTRIC INSTITUTE OFFICERS AND COMMITTEES

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(Terms Expiring 1954)

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(Terms Expiring 1955)

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(Terms Expiring 1956)

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Statistical, W. W. GODARD.....The Cleveland Electric Illuminating Co., Cleveland, Ohio
Transportation, D. K. WILSON.....Niagara Mohawk Power Corp., Albany, N. Y.

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Eldred H. Scott

Disabled Homemaker's Kitchen— On Wheels

L. L. Clemmer

Study of 1953 Annual Reports

ublished Monthly by Edison Electric Institute

ELECTRICAL RESEARCH STATISTICS
THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

November, 1952-1953

SOURCE AND DISPOSAL OF ENERGY—MONTH OF NOVEMBER

	1953	1952	%
GENERATION* (Net)			
By Fuel Burning Plants	29,471,468,000	27,216,797,000	+ 8.3
By Water Power Plants	6,906,906,000	6,564,081,000	+ 5.2
Total Generation	**36,378,374,000**	**33,780,878,000**	**+ 7.7**
Add—Net Imports Over International Boundaries	35,376,000	77,916,000	−54.6
Less—Company Use	130,565,000	116,118,000	+12.4
Less—Energy Used by Producer	304,410,000	545,945,000	−44.3
Net Energy for Distribution	**35,978,775,000**	**33,196,731,000**	**+ 8.4**
Lost and Unaccounted for	3,927,740,000	3,843,496,000	+ 2.2
Sales to Ultimate Customers	**32,051,035,000**	**29,353,235,000**	**+ 9.2**

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS—As of November 30th			
Residential or Domestic	41,885,457	40,635,964	+ 3.1
Rural (Distinct Rural Rates)	1,623,380	1,663,073	− 2.4
Commercial or Industrial:			
Small Light and Power	5,852,728	5,635,694	+ 3.9
Large Light and Power	273,094	258,056	+ 5.8
Other Customers	160,372	158,353	+ 1.3
Total Ultimate Customers	**49,795,031**	**48,351,140**	**+ 3.0**
KILOWATTHOUR SALES—During Month of November			
Residential or Domestic	8,247,564,000	7,460,446,000	+10.6
Rural (Distinct Rural Rates)	645,278,000	600,339,000	+ 7.5
Commercial or Industrial:			
Small Light and Power	5,785,117,000	5,186,674,000	+11.5
Large Light and Power	15,794,371,000	14,587,326,000	+ 8.3
Street and Highway Lighting	367,303,000	341,542,000	+ 7.5
Other Public Authorities	767,319,000	709,566,000	+ 8.1
Railways and Railroads:			
Street and Interurban Railways	227,686,000	250,063,000	− 9.0
Electrified Railroads	173,312,000	183,210,000	− 5.4
Interdepartmental	43,085,000	34,069,000	+26.5
Total To Ultimate Customers	**32,051,035,000**	**29,353,235,000**	**+ 9.2**
Revenue from Ultimate Customers	**$571,527,500**	**$527,426,200**	**+ 8.4**

RESIDENTIAL OR DOMESTIC SERVICE

AVERAGE CUSTOMER DATA—For 12 months ended November 30th			
Kilowatthours per Customer	2,331	2,155	+ 8.2
Average Annual Bill	$64.10	$59.69	+ 7.4
Revenue per Kilowatthour	2.75¢	2.77¢	− 0.7

* By Courtesy of the Federal Power Commission.

THE EDISON ELECTRIC INSTITUTE BULLETIN is published monthly by the Edison Electric Institute, an association of electric light and power companies in the United States and its territorial possessions. Its affiliate members consist of members of the Canadian Electrical Association.

The objectives of the Edison Electric Institute are:

The advancement in the public service of the art of producing, transmitting, and distributing electricity and the promotion of scientific research in such field.

The ascertainment and making available to the members and the public of factual information, data, and statistics relating to the electric industry.

To aid its operating company members to generate and sell electric energy at the lowest possible price commensurate with safe and adequate service, giving due regard to the interests of consumer, investor, and employee.

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Closing date for the BULLETIN is the tenth of the month preceding the month of issue.

Manuscripts and correspondence relating to the BULLETIN should be addressed to the Editor, Edison Electric Institute, 420 Lexington Avenue, New York 17, N. Y.

The Edison Electric Institute does not assume responsibility for, nor necessarily endorse or approve, statements made by contributors to the BULLETIN.

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Subscription price of the BULLETIN is $2.00 per year in the United States; $3.00 per year in foreign countries.

Entered as second-class matter, August 17, 1933, at the post office at Philadelphia 2, Pa., under the act of March 3, 1879. Publication office, 56th and Chestnut Sts., Philadelphia 39, Pa. Editorial office, 420 Lexington Ave., New York 17, N. Y. Volume 22, No. 2, 1954.

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3 EEI Plant Accounting and Property Records Committee, Netherland Plaza Hotel, Cincinnati, Ohio.

3- 5 EEI Meter and Service Committee, Adolphus Hotel, Dallas, Texas.

4- 5 EEI Home Service Committee, EEI Headquarters, New York, N. Y.

4- 5 EEI-AGA Accounting Conference Planning "Dress Rehearsal," Netherland Plaza Hotel, Cincinnati, Ohio.

4- 5 Missouri Valley Electric Association, Industrial and Commercial Sales Conference, President Hotel, Kansas City, Mo.

4- 5 EEI Commercial Lighting Committee, Washington, D. C.

5 PIP West North Central Region Meeting, Madison, Wis.

9-10 EEI Transmission and Distribution Committee, Hotel Cleveland, Cleveland, Ohio

11-12 PEA Transmission and Distribution Committee, Lord Baltimore Hotel, Baltimore, Md.

11-12 EEI Commercial Cooking and Water Heating Committee, Kellogg Institute, Michigan State College, East Lansing, Mich.

11-12 PUAA Region 5 Meeting, Atlanta, Ga.

15-16 National Association of Purchasing Agents Mid-Winter Conference, Public Utility Buyers' Group, Lord Baltimore Hotel, Baltimore, Md.

15-16 EEI Electrical Equipment Committee, Sheraton Cadillac Hotel, Detroit, Mich.

15-17 EEI Industrial Relations Committee Dinner Meeting in conjunction with AMA Mid-Winter Personnel Meeting, Chicago, Ill.

15-19 ASCE Atlanta Convention, Biltmore Hotel, Atlanta, Ga.

17 PIP Inter-Regional Meeting, Blackstone Hotel, Chicago, Ill.

18-19 EEI Commercial Space Heating and Air Conditioning Committee, Tutwiler Hotel, Birmingham, Ala.

18-19 PEA Systems Operation Meeting, Fort Stanwix Hotel, Johnstown, Pa.

19-20 Controllers Institute of America, Southern Conference, Hotel Roosevelt, New Orleans, La.

25 PIP East North Central Regional Meeting, Cleveland, Ohio

25-26 PUAA Region 1 Meeting, Montreal, Que.

25-26 PEA Winter Meeting, Electrical Equipment Committee, Hotel Roosevelt, Pittsburgh, Pa.

25-26 10th Annual National Adequate Wiring Conference, LaSalle Hotel, Chicago, Ill.

MARCH

1- 5 CEA Western Division, Winnipeg, Man.

4- 5 PEA Winter Meeting, Relay Committee, Benjamin Franklin Hotel, Philadelphia, Pa.

10-12 ASME International Meeting, Hotel Del Prado, Mexico City, Mex.

18 EEI Industrial Relations Committee, EEI Headquarters, New York, N. Y.

18-19 Pacific Coast Electrical Association Engineering and Operating Section Meeting, Hotel Mark Hopkins, San Francisco, Calif.

1954

21-23 Controllers Institute of America Eastern Conference, Sheraton Park Hotel, Washington, D. C.

22-24 Southeastern Electric Exchange 21st Annual Meeting, Boca Raton Hotel, Boca Raton, Fla.

25-26 Oklahoma Utilities Association Annual Convention, Biltmore Hotel, Oklahoma City, Okla.

APRIL

5- 8 20th Annual EEI Sales Conference, Edgewater Beach Hotel, Chicago, Ill.

7- 8 Pacific Coast Electrical Association, Administration Services Section, Hotel Claremont, Berkeley, Calif.

7- 9 Missouri Valley Electric Association Engineering Conference, President Hotel, Kansas City, Mo.

8- 9 IES Southern Regional Conference, Roosevelt Hotel, New Orleans, La.

11-14 IES Southwestern Regional Conference, Rice Hotel, Houston, Tex.

12-14 EEI-AGA Accounting Conference, Hotel Statler, Boston, Mass.

15 EEI Industrial Relations Committee, Netherland Plaza Hotel, Cincinnati, Ohio

15-16 IES Inter-Mountain Regional Conference, Denver, Colo.

19-20 IES South Pacific Coast Regional Meeting, Museum of Art, San Francisco, Calif.

22-23 IES Pacific Northwest Regional Meeting, Benjamin Franklin Hotel, Seattle, Wash.

26-27 NCEA Accounting Meeting, Dyckman Hotel, Minneapolis, Minn.

28-30 IES Canadian Regional Meeting, King Edward Hotel, Toronto, Ont.

29 NAEC Annual Meeting, Mayflower Hotel, Washington, D. C.

MAY

3- 4 IES Great Lakes Regional Meeting, Sheraton Cadillac Hotel, Detroit, Mich.

3- 5 EEI Purchasing and Stores Committee, Hotel Roosevelt, New York, N. Y.

11 EEI Commercial Electric Cooking Conference, Sheraton Hotel, Chicago, Ill.

13-14 PUAA Annual Convention, Hotel Statler, Boston, Mass.

19-21 Pacific Coast Electrical Association Annual Convention, Hotel Del Coronado, Coronado, Calif.

JUNE

1- 4 EEI ANNUAL CONVENTION, Atlantic City, N. J.

3- 5 Controllers Institute of America Western Conference. Empress Hotel, Victoria, B. C.

14-19 ASCE Convention, Chalfonte Haddon Hall, Atlantic City, N. J.

17-19 IES Midwestern Regional Meeting, Hotel Jefferson, St. Louis, Mo.

24-26 CEA Annual Convention, Murray Bay, Quebec, Que.

27-30 Michigan Electrical Association Annual Convention, Grand Hotel, Mackinac Island, Mich.

JULY

12-13 EEI Industrial Relations Committee Joint Meeting with Personnel Section of Northwest Electric Light and Power Association, Hotel Multnomah, Portland, Ore.

The EDISON ELECTRIC INSTITUTE
BULLETIN

Seventy-Five Years of Public Utility Regulation In a Competitive Society

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SEVENTY-FIVE years ago the modern era of public utility regulation was ushered in by the famous Munn v. Illinois[1] decision of the U. S. Supreme Court. Before examining what has happened since that decision, a brief review of the political and economic history leading up to it might be of value.

The tradition of individual freedom in the United States was an outgrowth of the political and economic oppression of European nations. The earliest colonists who settled here were dedicated to freedom of the individual. The demand for political freedom was the major factor in the American Revolution and was strongly and clearly expressed in the founding documents of the new nation—the Declaration of Independence, Constitution, and Bill of Rights.

Support for the desire for economic freedom was found in the new economic philosophy of Adam Smith and other members of the so-called Classical school of economics. This philosophy, known by such names as laissez-faire or competitive free enterprise, emphasized the independence of the individual from the state in the determination of his own economic fortune.

Thus, under these philosophies, the United States became the world model for economic and political individualism. The rights of the individual and the rights of property were relatively unrestrained. The functions of government were limited to certain specified activities necessary to avoid anarchy. The economic system was predicated on the belief that the maximum production of wealth and the greatest social welfare would be achieved when men were free from all forms of control except those of police power.

Under this system, competition became the "guiding hand" which regulated economic activity by turning the "self-interest" of individuals into channels that would result in the production of the maximum goods and services and, therefore, the greatest social welfare.

Freedom and Regulation

The rapid development of industry and the concurrent improvement in the American standard of living were nurtured by the freedom of economic action allowed under the system of free enterprise. Even today, after 175 years, the philosophy of freedom that was the cornerstone of our nation's foundation still holds a predominant place in the ideology of the American system.

The development of regulation of public utilities in such an atmosphere requires explanation.

It is, today, well understood that the controlling characteristics of public utilities which separate them from other industries for regulatory purposes is that they tend to be monopolies. Instead of trying to establish fair competition in such industries, the state has decided that monopoly is in the best public interest. Competition would involve duplication of resources and waste.

But the realization that public utilities differed from other industries in this respect was a long time coming. Although some industries, now known as public utilities, were regulated to a very limited extent prior to the Munn decision, the belief in freedom of enterprise with respect to such industries remained quite strong. People believed that competition among companies would solve the problems of price and service. If one charged too much or gave poor service, another could be chartered to compete with it. Thus, in many parts of the nation, there were two or more public utilities serving the same area.

Eventually, the realization grew that competition in such industries was a relatively unstable condition. As time went on, companies began to combine and monopolize the service in their franchise areas. Cutthroat competition among utilities forced them into either bankruptcy or combination. Sharing of one service area made rates to consumers higher than they would have been with one company. Having two or more sets of transit tracks, wires, or gas mains was a public nuisance. It came to be realized that a public utility was inherently a monopoly. Competition

1. 94 U. S. 113 (1877).

among utilities was found to be not in the public interest because the results of such competition were not in the public interest.

In the absence of the automatic regulation of competition, it became necessary to create a substitute. The best substitute for competition between public utilities is public regulation. To understand this concept better, let us take a look at the functions of competition as an automatic regulator of those businesses subject to its force.

Functions of Competition

The major functions of competition are (1) promotion of technical progress, (2) promotion of efficiency, (3) regulation of profits, (4) lowering of prices, (5) promotion of better quality of goods and services, and (6) adjusting supply to demand. Competition is thus a regulator and a spur. It induces progress in spite of the fact that most people are not naturally progressive. It penalizes inefficiency and rewards efficiency. It is sound economics.

In a free-enterprise system, the absence of competition without regulation is not thought to be in the public interest. Such a situation can lead to inefficiency, technological stagnation, rigid prices, and excessive profits. Therefore, since public utilities are not subject to competition in the same sense as other industries, they should be regulated. But it is equally clear that such regulation under our economic system is only justified as a substitute for competition.

Regulation of public utilities should involve a sound application of the economic principles of the American economic system. It should attempt to put regulated industries under the same restraints as unregulated industries. To go further than that would indicate a lack of faith in the private-enterprise system.

A Difficult Process

We are asking much of regulation when we ask that it follow the guide of competition. As Americans, we have set up a system that indicates we have little faith in economic planning by government. Yet, we are asking our regulators to exercise the judgment of thousands of consumers in the evaluation of our efficiency, service, and technical progress so that a fair profit can be determined. Fair regulation is now, and always will be, a difficult process. But it is not impossible.

It is necessary for us to remember that we still operate under a relatively free economic system in which competition is the major regulating, directing, and organizing force. When we remove certain industries from control by that force, we must substitute other controls to take its place. These controls have no justification under our economic system unless they perform the functions of competition. Let me repeat that: these controls have no justification under our economic system unless they perform the functions of competition. When they go beyond this, they destroy private enterprise in the utility field.

The question which now comes to mind is this: has regulation been applied in accordance with the economic principles of a competitive system? The rest of this paper will be devoted to an attempt to answer this question.

Three Phases of Regulation

The history of modern public utility regulation consists of three major phases—legislative, judicial, and administrative. The legislative phase began with the Munn v. Illinois decision in 1877. The Granger movement of the 1870's had helped bring about the establishment of some strong state commissions with control over the rates of railroads and some other businesses. The farmers had found that their economic bargaining power was very limited in dealing with the grain elevator proprietors. When the State of Illinois passed a law regulating these elevators and prescribing maximum rates, its right to pass such a law was challenged. The U. S. Supreme Court, in upholding the right of Illinois to pass such a law under its police powers, thus established the constitutionality of such laws. It was also ruled that rate control was a legislative function and that recourse against abuse of that function must be political and not judicial.

It became apparent over the next few years that the legislatures were not properly organized to carry on rate regulation. The Supreme Court soon changed its position concerning legislative abuse of the states' newfound power and warned commissions that rates should not be "confiscatory."

In a decision in the Chicago, Milwaukee & St. Paul Ry. v. Minnesota[2] in 1890, the Supreme Court reversed itself completely, saying that the reasonableness of a rate was subject to judicial review. This was the beginning of the long judicial phase which was strongly concerned with the economic aspects of regulation.

Factors of Valuation

The Smyth v. Ames[3] decision of the Supreme Court in 1898 was a real step in the direction of sound economics in public utility regulation. The decision listed the many factors of valuation that a commission must consider in order for the results to yield a fair return on the fair value of utility property. Smyth v. Ames indicated that regulation would not be an easy job. It indicated the necessity for trained people on the staffs of utility commissions.

Many students of public utility regulation have claimed that the Smyth v. Ames decision hamstrung commissions with complicated matters of law, accountancy, engineering, and economics. In reality, the decision merely recognized that regulation was complicated and not subject to a simple formula method that could be applied with equity in all cases or at all phases of the economic cycle.

Synonym for Fair Value

Reproduction cost became the synonym for fair value. At the time, the commissions were quite willing to accept reproduction cost with price levels below what original cost valuation would have brought. Later, the public regulators came to regret their acceptance of this doctrine—not because it would result in inequitable prices for utility services, but because it would mean higher rates comparable to the price increases throughout the rest of the economy.

Reproduction cost, no matter which phase the business cycle may be in, recognizes the parallel economic factors under which unregulated industry must operate. In competitive enterprise, current incremental costs determine prices; thus reproduction cost puts utility owners on the same earnings basis as competitive enterprise. Reproduction cost takes into account the changes in the purchasing value of the dollar. Thus, it recognizes both inflation and deflation as

2. 134 U. S. 418 (1890).
3. 169 U. S. 466 (1898).

they are recognized under competitive pricing. It is even politically good in that it tends toward lower rates in depression times, when the pressure for price cuts is greatest, and higher rates in boom times, when people can better afford them.

But, the really strong argument for reproduction cost is that it sticks strictly to the original purpose of, and justification for, regulation by limiting regulation to those factors whose benefits might otherwise be lost by eliminating competition. Thus, the rate increases which might occur because there is no competition are controlled, but the cost variations which result from outside economic influences are permitted.

Observance of Reproduction Cost

Some of the objections to strict observance of reproduction cost have some validity. They do not, however, destroy the concept; they merely modify it. The argument that reproduction cost is too difficult to determine has no validity whatsoever, as is illustrated by its successful application in Ohio. There, it works well for the consumer as well as the utility and has resulted in low rates and healthy profits. That the consumer does not object too vigorously to Ohio rates under reproduction cost now may be seen in the fact that bills for its repeal, introduced in the Ohio Legislature in each of the past few years, have had little support. The Public Utilities Commission of Ohio has had the capacity and ingenuity to apply this method of valuation so that the results are equitable to all concerned.

Following the Smyth v. Ames decision, up to the 1930's, there were a number of cases in which the Supreme Court ruled that commissions must give weight to reproduction cost in determining fair value[4].

In the 1920's, rising prices resulted in some modification of reproduction cost. Attempts were made to determine a relatively "normal" plateau of prices based on future predictions of price trends.[5] Another modification was the so-called "split inventory" method.[6] This based value on normal pre-war reproduction cost for pre-war investment and actual prices for investment made during and after the war. These modifications of reproduction cost were attempts to make valuation reflect the long-run economic trends of the times in line with the experiences of competitive business.

Determining Annual Rate

Where Smyth v. Ames forced the state commissions to consider the economic factors in rate base valuation, the Bluefield Case[7] accomplished the same purpose in rate of return. The Supreme Court, in this decision, found that determination of the annual rate that would constitute just compensation depended on many circumstances and required the exercise of a "fair and enlightened judgment." Though warning against speculative profits, the court found that a utility was entitled to a rate "equal to that generally being made at the same time and in the same general part of the country on investments and in other business undertakings which are attended by corresponding risks and uncertainties."

Thus, judicial recognition was given to the fact that utilities must compete for capital in the same markets as unregulated industry. The return, continued the court, should be sufficient to assure confidence in the financial soundness of the utility and adequate to support its credit and enable it to raise necessary capital. It was pointed out that the reasonableness of a particular rate of return would change as changes occurred in the opportunities for investment, the money market, and business conditions in general.

The judicial phase put the regulatory commissions on the spot. The rule of Smyth v. Ames required that full consideration be given to the many economic factors pertinent to valuation. It limited regulation to those factors arising as a result of elimination of competition, since valuation of property would be changed only as a result of changing economic conditions. The Bluefield Case said that the fair rate of return for a utility should be gauged by that received in competitive industry of similar risk. Regulators were faced with the choice of either searching out the facts and reaching a decision in line with those facts, or having their decision overruled by the courts.

The Los Angeles Gas & Electric Corp. Case (1933)[8] signalled the end of the judicial phase of regulation. In this case the Supreme Court held that where a utility could not prove confiscation of its property, the procedure and method of determining reasonable rates would be in the commission's jurisdiction. Thus began the doctrine of end result and the administrative phase of regulation. Commissions were freed from what the academic fraternity called "the shackles of the rule of Smyth v. Ames." Only in cases of obvious injustice would the courts interfere with rulings of the regulatory bodies. The method of determining "end result" was not important—even if sound business and economic precepts were ignored—as long as the utility was unable to prove to the court's satisfaction that its property was being confiscated.

Changes in Business Structure

The depression of the 1930's brought many changes in the social and business structure of the economy. The economic theorists, in their search for the cause of the debacle of 1929 and its aftermath, concluded that the Federal government should have a leading role in regulating the operation of the business system. Their conclusions and their theories were applied by the administration in power, and, as a result, regulation of industry in general was increased in scope. This philosophy was reflected in the decisions of regulatory bodies as well as in the rulings of the courts. During this period, the Federal regulatory commissions were organized or strengthened, and some utilities found themselves faced with the growing giant of direct Federal competition.

In the changed economic atmosphere, with the courts abdicating their review authority to the commissions, what happened to regulation? Did the new-found freedom of action granted to the commissions result in equitable regulation? Did the regulatory treatment of utilities follow the

4. Knoxville v. Knoxville Water Co., 212 U.S. 1 (1909); Wilcox v. Consolidated Gas Co., 212 U.S. 19 (1909); Minnesota Rate Cases, 230 U.S. 352 (1913); Galveston Electric Co. v. Galveston, 258 U.S. 388 (1922); Southwestern Bell Telephone Co. v. Public Service Commission, 262 U.S. 276 (1923); Bluefield Water Works & Imp. Co. v. Public Service Commission, 262 U.S. 679 (1923); McCardle v. Indianapolis Water Co., 272 U.S. 400 (1926).

5. Galveston Electric Co. v. Galveston, 258 U.S. 388 (1922).

6. Georgia Ry. & Power Co. v. Railroad Commission, 262 U.S. 625 (1923).

7. Bluefield Water Works & Imp. Co. v. Public Service Commission, 262 U.S. 679 (1923).

8. Los Angeles Gas & Electric Corp. v. Railroad Commission, 289 U.S. 287 (1933).

original concept of substitution of control for competition? Let us examine this most recent phase to see what has happened.

The Supreme Court decision in the Natural Gas Pipeline Case[9] in 1942 was an intimation of the change in thinking relative to valuation of utility property for rate-making purposes. The rule of Smyth v. Ames was not denied, but the Court said that the commissions were not bound to any one formula. It remained for the decision in the Hope Natural Gas Case[10] to deal the final blow to what had been accepted practice in valuation since 1898.

The Rush Toward Original Cost

The arguments that the Hope Case did not "lay the ghost" to reproduction cost are specious. While it is true that the court did not approve any particular method of rate-base determination, the result was an almost wholesale rush toward original cost by the regulatory bodies. Valuation by this method ignores completely what occurs in the competitive segment of industry where fixed plant tends to rise and fall in value with earnings and the price level. Original or historical cost does not limit regulation to those factors which arise as a result of the elimination of competition; it does not require consideration of any of the economic factors of the present, nor does it allow a forecast of what may logically happen in the near future.

Those who claim that strict observance of original cost will result in equity to the investor and consumer in all phases of the business cycle are ignoring reality. The consumer, under original cost, will always get lower rates than are warranted by the economic facts as long as price trends continue upward. The investor in utility equities will, under the same circumstances, always receive less than competitive conditions would justify as his economic reward for risk-taking. If price trends move downward, the exact opposite situation would theoretically occur. Consumers would pay higher rates than are economically justified, while investors would receive an excessive return.

Would historical cost be applied as vigorously on the down side of the cycle as it has been applied on the up side? If the nation were to enter a long-term period of declining prices, would the regulatory bodies ignore the almost certain public demand for rate decreases by allowing utilities a valuation based on original cost of plant built during the post-war, high-cost construction period? The answer to these questions is obvious: it is "No."

The favorite argument used by advocates of the historical cost formula is that this method of valuation makes the job of regulation more convenient and less difficult for the regulatory bodies. They are absolutely correct. Nothing could be simpler than to examine the accounting records of a company, find the book entries for the "plant" account, make the necessary other accounting and formula adjustments (which I will mention later), and say, "This is it, boys." It may make the task of regulation easier but only by happenstance does it ever result in equitable treatment of the regulated companies.

When regulation is made so easy, it is not necessary to worry about whether qualified people are hired as regulators. No expert opinion is needed, or even wanted, if regulation is to become the mere application of a fixed formula to hold good even though changed conditions may make the results of such application seem ridiculous.

Economic Assumptions of the 1930's

There are those who admit that the historical cost method of rate-base valuation may not be flexible enough to fit into changing economic conditions. However, they say, it is not necessary to have a value rate base to overcome this inflexibility. They conclude that historical cost can result in equitable regulation if it is used with an adjusted rate of return which rises and falls as economic conditions warrant. It is true that, in theory, varying the rate of return would improve regulation in original cost jurisdictions. But, if so, why haven't such variations taken place in some rate decisions during one of the worst inflations in our history? The trend of decisions on rate of return has indicated a lower rate rather than the higher rate that would be logically expected in time of inflation.

In order to accept original cost as being equitable as well as easy to administer, it is necessary also to accept the economic assumptions of the 1930's. These assumptions presumed that the economy was stagnant, that interest rates would stay on a downward trend, and that the opportunities for investment would decline. The implication was that, in the long run, money would tend to retain its value. These so-called Keynesian theories also placed major emphasis on the demand side of the supply-demand equation. It has been proved, in recent years, that these assumptions are incorrect. The postwar expansion of all industry does not support the stagnation thesis. Interest rates have trended upward since late 1947. Investment opportunities have certainly not decreased. Money has not been a stable measure of value.

The equity investor has had to bear the burden of the unsound economic assumptions involved in original cost theories.

A Share of the Blame

The utility companies have to share the blame for the adoption of this original cost theory of valuation. They did not vigorously fight its application in the beginning because price levels were relatively stable at that time. They were not far-sighted enough to see how the use of this method might endanger the very foundations of private ownership in the utility industry. They are quite aware of the danger now.

The fact that original cost may not fill the bill in an inflated economy has received recognition in some recent telephone rate cases. For example, in 1952 the Circuit Court set aside a decision of the Indiana Commission in the Indiana Bell Telephone Co.[11] Case because no recognition was given to reproduction cost. This year the Illinois Supreme Court, for the same reason, set aside a commission decision in the Illinois Bell Case.[12] In the New England Telephone & Telegraph Co. Case,[13] the Maine Supreme Court, in 1953, set aside a commission decision which refused to let the company offer proof of current values and rising costs in evidence of the rate base and the need for higher rates.

9. Federal Power Commission v. Natural Gas Pipeline Co., 315 U.S. 575 (1942).
10. Federal Power Commission v. Hope Natural Gas Co., 320 U.S. 591 (1944).
11. Indiana Bell Telephone Co. v. Public Service Commission, 93 PUR (ns) 480 (1952).
12. Illinois Bell Telephone Co. v. Public Service Commission, CCH Utilities Law Reports, par. 16,347 (1953).
13. New England Telephone & Telegraph Co. v. Public Service Commission, CCH Utilities Law Reports, par. 16,389 (1953).

In other recent cases, the Maryland Supreme Court[14] reaffirmed that current cost of reproduction must be considered, and a Federal court in Texas issued an injunction against local regulation which had failed to consider reproduction cost. This change in thinking has been a long time coming, but it is very encouraging to see the courts again take judicial note of the economic factors in rate-base valuation.

How have the regulatory bodies handled the problem of rate of return under the freedom of action of the administrative phase? In the Bluefield Case, the Supreme Court had noted that utilities must compete with other industry in obtaining their investment funds and that the rate of return, to be fair, must necessarily reflect that competition. The Hope Case decision did not invalidate the findings in the Bluefield Case, but it did leave the door open to commission discretion. And, as has been the case with rate-base valuation, commission discretion has not always been in line with sound economics. Very few commissions, in setting a rate of return, have shown interest in an examination of alternative investment opportunities outside of the utility field in order to allow utility equity investors a rate comparable with that of similar risk, non-regulated industries.

Trends in Rate-of-Return Regulation

The trend in regulation of rate of return since the Hope Case has been, in many jurisdictions, either to maintain some fixed percentage or to reduce the percentage allowed. Maintaining a fixed percentage rate and applying this rate against a historical cost rate base shows an utter disregard of economic trends. Reducing the percentage, when rates earned by investors in unregulated industry have reached new highs, means that the utility equity investor has been left out in the cold. Not only does he not participate in the earnings of a boom economy but he finds that the real value of his investment has been diluted.

In competitive industry the rate of return received reflects the factors of pure interest, risk, financing costs, and reward for efficient management, plus an amount to be retained in the business. Therefore, if regulation is to be a substitute for competition, the regulatory bodies are obliged to allow public utilities a rate of return which reflects these factors.

The most recent trend has been to accept historical cost of money as the sole yardstick of reasonableness in rate of return determinations. Such a procedure was followed by the Federal Power Commission in the Northern Natural Gas,[15] Colorado Interstate Gas,[16] and Mississippi River Fuel[17] cases. Cost of capital has never before been even a narrowly accepted sole measure of the rate of return.

Obvious Fallacies

The fallacies of such a procedure are quite obvious. Limiting the rate of return on borrowed money to the interest cost eliminates completely the leverage factor. This limits the appreciation possibilities of common stock. Using this formula puts a ceiling on potentialities of per share earnings since a rise in the common stock market price would lower the earnings-price ratio and might force a rate decrease. Thus, you might say, the vagaries of the stock market would control rates. Using past cost to set future rates, especially in an inflationary period, is illogical.

How would the continued application of this doctrine affect the gas companies' expansion plans? The market weakness in natural gas equities after the Federal Power Commission rulings provides the answer. The cost of capital formula allows no reward for efficiency and, in fact, would result in a higher rate for less efficient companies because of their higher cost of capital. The fallacies of this recent development have been discussed at length in a series of articles in *The Public Utilities Fortnightly* and have been reprinted in pamphlet form under the title, "Should Cost of Capital Limit a Utility's Return?"

Inequitable Regulation Spreads

Inequitable regulation has a tendency to spread. In six out of ten state commission rate decisions on Bell System subsidiaries in early 1952, the rate of return was fixed more or less on the basis of cost of capital. In one case, however, the Illinois Supreme Court[18] upset a commission decision partially because of the commission's use of cost of capital. In July, 1953, the 8th U. S. Circuit Court of Appeals upset the Federal Power Commission order in the Northern Natural Gas Case and called it "unjust and unreasonable." The Federal Power Commission has, apparently, already abandoned its position on cost of capital and returned to the cost of service concept with its decision in the Texas Eastern Transmission interim rate settlement late last year. Perhaps the adverse publicity, stock market reaction, and determination of the natural gas companies to fight it out in the courts have had some effect.

Treatment of Depreciation Reserve

The regulatory treatment of depreciation reserve in relation to the rate base has run the gamut from no deduction through deduction of an engineering determination, deduction of an accounting reserve, and deduction of a computed amount. In the administrative phase of regulation, again, the regulatory bodies have looked for the easy way out in their treatment of the reserve. Deducting the reserve from the historical cost rate base, which the Hope Case seems to allow, has simplified the regulatory computation of a rate base but is not in line with sound economics, equitable regulation, or value in competitive, unregulated industry.

Such deduction is based on the questionable theory that the customer has a full equity in the depreciation reserve. Whatever equity the customer may have certainly arises only if (1) the utility is able to make full use of these funds by reinvesting them in the business, (2) the utility is already earning a fair rate of return, (3) the reserve is adequate to replace the property, and (4) there is some allowance made to compensate management for the responsibility of managing these funds. Few commissions take the trouble to make a full investigation of the equity of the reserve deduction when finding value for rate-making purposes. Yet competitive conditions would automatically adjust for these counter equities of the common stock investor.

The trend in depreciation accrual allowance has also been in the direc-

14. Chesapeake & Potomac Telephone Co. v. Public Service Commission, 97 PUR (ns) 50 (1952).

15. Re Northern Natural Gas Co., 95 PUR (ns) 289 (1952).

16. Re Colorado Interstate Gas Co., 95 PUR (ns) 97 (1952).

17. Re Mississippi River Fuel Co., 95 PUR (ns) 435 (1952).

18. Illinois Bell Telephone Co. v. Public Service Commission, CCH Utilities Law Reports, par. 16,347 (1953).

tion of simplicity. Straight-line depreciation of original cost has become the accepted formula for depreciation accounting. Depreciation allowance by this formula recovers only dollars and does not allow for real costs. The American dollar has certainly not been sanforized. Its shrinking value in recent years has placed a tight collar around the neck of the utility equity investor who finds that inadequate provision for replacement results in misstated earnings and exhaustion of his capital investment. Use of this formula represents one more case of utility regulation going beyond what is necessary to approximate conditions in unregulated industry. Competitive industry is able to recover value rather than original cost through the plow-back of earnings or by making special provision for higher depreciation. The steel industry, in particular, has recognized the inflation danger by provision of special reserves for higher replacement costs.

Adequate Working Capital

Regulation has gone quite deeply into the area of management through the substitution of mathematical formulae for what used to be the judgment of utility management. The growing use of the so-called one-eighth formula for determining working capital to be allowed in the rate base is a case in point. When such a formula is applied in all cases and at all times it must result in inequitable regulation. What is adequate working capital for one company may be completely inadequate for another.

Working capital that is adequate now may not be adequate in the future. Placing a ceiling on the allowance limits the flexibility of decision which good management needs in order to take advantage of current conditions. It is the current economic and business factors which should determine a company's need for working capital, not a formula set by an administrative body which has neither the time nor the knowledge to judge such needs. Unregulated industry has no such problem.

A recent and very dangerous outgrowth of this working capital formula has been the theory that alternative funds, such as Federal income taxes collected in advance of payment, should be used for cash working capital purposes. For example, the Federal Power Commission held, in the recent Alabama-Tennessee Natural Gas decision,[19] that the company's working capital must be reduced by the cash collected in advance for payment of Federal income taxes. The Mills plan, requiring a speed-up in payment of taxes, makes such deduction even more dangerous since companies are coming closer to a pay-as-you-go basis and a sharp downturn in revenue could put a company in a serious cash position.

The full use of tax funds for cash working capital is speculation, pure and simple. Regulation is supposed to ensure the financial integrity of utilities by requiring conservative financial practice. Only the most speculative unregulated companies make full use of tax funds for cash working capital, and they sometimes get into financial difficulties because of this. If the regulators are going to force utilities into such unsound and speculative financial practices, it will be necessary for them to recognize the increased risk to investors inherent in such practices. And, as risk increases, it follows that the investor's reward for risk-taking must be increased if capital is to be attracted to the industry without penalty to the existing owners.

Some state commissions have apparently followed the lead of the Federal Power Commission in scaling down allowances for cash working capital by deducting tax reserves. In recent cases involving United Fuel Gas,[20] Chesapeake & Potomac Telephone,[21] and Pennsylvania Telephone,[22] the cash working capital was adjusted, or even eliminated, because of the amount of cash available through collection of Federal income taxes in advance of payment.

Regulatory Treatment of Taxation

Another area where the original purpose of regulation has been ignored in recent years has been in the regulatory treatment of taxation. The Galveston Electric Co. case in 1922 settled the issue of allowing taxes to be deductible expenses in computing the fair rate of return. The problem of taxes did not become an important issue in regulation until the high tax rates of recent years. Now, however, the regulatory lag in granting of rate relief imposes new taxes on the utility equity investor when the company is earning less than a fair rate of return.

Effect on Stockholders

Also, some commissions have not been disposed to grant rate relief when increased earnings would put the utility in the excess profits tax bracket. They argue that the burden of a rate increase on the consumers will primarily benefit the tax collector. This argument does not even consider the effect of the burden on the stockholder. Since unregulated industry can, to a large extent, pass on tax increases to the consumer, the same should hold true for regulated companies, if such regulation is to be a true substitute for competition.

During World War II, the heavy tax load which the utilities were forced to bear cut deeply into the earnings of stockholders. The utilities, remembering their experience in the war, went to Congress in 1950 to get fair treatment under a new excess profits tax. They knew that there would be political pressure applied to the regulatory bodies to keep them from allowing the full, actual tax cost as an expense of utility operation.

When the war began in Korea, Congress set up a program of rapid amortization of emergency defense facilities in order to induce industry to take the risks inherent in investing in plant and equipment purely for defense purposes. Under the program, industry is able to write-off certified plant in five years for tax purposes, and, therefore, receive a higher-than-normal income for those years. Unless, however, tax rates decline after the five-year period, the only benefit received by a utility company is the use of interest-free funds for construction purposes during that period. Since taxes would be higher after the period of accelerated amortization, utility companies have asked for, and many state commissions have granted, permission to normalize income by the amount of the tax saving, in order to provide a reserve to pay the future higher taxes resulting from the acceptance of fast amortization certificates. Many utilities have felt that, if the tax savings during the five-year period were allowed to increase gross income, they would be forced into giving rate decreases.

19. Re Alabama-Tennessee Natural Gas Co., 94 PUR (ns) 426 (1952).
20. Re United Fuel Gas Co., 95 PUR (ns) 65 (1952).
21. Re Chesapeake & Potomac Telephone Co., 93 PUR (ns) 215 (1952).
22. Pittsburgh v. Public Utility Commission, 82 A 2d 515 (1951).

It is certainly illogical to use an act of Congress which was intended to induce investment in facilities for national defense to force rate decreases. The ratepayer was induced to do nothing. And, it is completely illogical to let the reduction in taxes be reflected in net income, thereby misleading investors into paying higher prices for stock than they would if they realized the future tax liability involved. Yet, some regulators are advocating that these tax savings be reflected in income and that rates be reduced by the amount of the tax saving. Such regulation goes far beyond substitution for competition.

Overlapping Jurisdiction

Another regulatory liability which has developed in the administrative phase is that of overlapping jurisdiction between Federal and state regulatory bodies. Federal regulation was authorized by Congress under the commerce clause of the Constitution to fill in the gap in regulation caused by utilities operating across state lines. Since the early 1930's, the growth of Federal regulation in relation to state regulations has been increasing rapidly. Much of the growth has been in the direction of encroachment on the accounting, rate-making, and other functions of the state commissions. Many cases could be cited as examples of Federal encroachment, but I will refer to just four—East Ohio Gas Co.,[23] Jersey Central Power and Light Co.,[24] Arizona Edison Co. and Central Arizona Light & Power Co.,[25] and Mount Morris Gas Co.[26] This frequent conflict in jurisdiction between state commissions and the Federal bodies places utility managements in a difficult position. When regulation concerns itself with controversy over jurisdiction, the results often make for poor regulation. Regulation of this type is not concerned with finding the substitute for competition; it is just regulation for the sake of regulation.

Increasing Direct Competition

This talk would not be complete unless I brought out the fact that, though public utilities are monopolies in a legal sense, they are not free from competition in the business sense. Virtually all utilities have increasing direct competition with other products, to say nothing of the indirect competition for the consumers' dollar. An electric company may have competition from the gas industry in its area, and vice versa. A gas utility may have competition from locally-mined coal. In particular, many electric companies face direct competition from privately-owned industrial generating plants and other localities in the industrial development field.

As such competition increases, the regulation of the market place increases. This is the soundest form of all regulation, and it should be permitted to perform its economic function. However, as the regulation of utilities in the market place increases, the purpose in being of the regulatory agencies decreases. This concept requires acknowledgment in commission decisions if regulation is to act as a competitive substitute.

Besides, competition from other business enterprise, regulated industry—particularly in the field of electric power—is faced with increased competition from government and government-subsidized enterprise. The major growth and development of this form of competition took place during the administrative era of regulation. The economic and political philosophy of the 1930's was the perfect breeding ground for the major growth of public power. The utility industry, because of financial manipulations in holding company securities and attendant financial failures, was not in the good graces of the public.

The "Yardstick" Idea

In such an atmosphere, the founding of the Tennessee Valley Authority took place. The "yardstick" idea was popular and received considerable publicity. It was felt that, by using the Tennessee Valley Authority as a measure of electric rates, the rates of the private electric companies could be kept low. Such a theory, though completely out of line with reality, was widely accepted at the time. Regulation by the use of public power projects as yardsticks is unfair regulation although it may be good politics. It is not a good substitute for competition. No public power project can ever be a real measuring device as long as it is tax-exempt or can obtain construction money at government bond money rates, or can allocate part of its electric costs to flood control or navigation.

The "yardstick" idea, though it still crops out now and then, has largely been abandoned by even the strongest advocates of Federal power ownership. The major danger of Federal power now comes from its direct competition with private utilities. When there is direct competition between government and private industry, the government will always win because of the special privileges granted to public enterprise. It is almost impossible for investor-owned industry to meet a price which does not include taxes or equity capital costs. To illustrate this, more than 100 electric companies have gone under since 1933 because of government competition. This is not regulation substituting for competition. This is cutthroat competition substituting for regulation.

Application of Preference Clause

The application of the preference clause of the Federal Power Act also has its effect. Since this clause provides for the marketing of power from Federal power projects by first offering it to municipalities, rural electric cooperatives, and other public bodies, the bureaus in charge have a perfect excuse for building transmission lines which duplicate those already set up by private companies. That is, they have the excuse if they can't (or won't) get a wheeling contract signed by the private companies. In many cases, it has been illustrated that they don't even want wheeling contracts. After the transmission lines are built, a citizens' group in a nearby city served by a private electric company starts agitating to get some of the Federal "low-cost" power. The next step is the setting up of a municipally-owned plant which buys out the private company. Thus, another investor-owned company goes down under the growing Federal power threat.

Rural Co-ops

The rural electric cooperative is another device which has been used to further the public power idea. The original purpose of the Rural Electrification Administration was to help supply electricity to persons not receiving central station service. This purpose has not been adhered to in recent years, with the cooperatives actually going after private utility customers. These subsidized co-ops are

23. Federal Power Commission v. East Ohio Gas Co., 338 U.S. 464; 70 S Ct 266; 82 PUR (ns) 1 (1950).
24. Jersey Central Power & Light Co. v. Federal Power Commission, 319 U.S. 61; 63 S Ct 953; 48 PUR (ns) 129 (1943).
25. Re Arizona Edison Co., Re Central Arizona Light & Power Co., 84 PUR (ns) 3 (1950).
26. Re Mt. Morris Gas Co., 3 FPC 818 (1945).

no longer content merely to own their own transmission lines but are starting to build their own power plants.

Interference by Interior

There is another important area in which Federal power activities interfere with private enterprise in the electric utility business—the area of expansion of hydroelectric facilities. The Interior Department has claimed that the Federal government has sole developmental rights to power sites on navigable rivers. This claim has resulted in holding up expansion plans of electric companies.

In the case of Roanoke Rapids and Hells Canyon, Interior saw fit to intervene in the granting of licenses to electric companies by the Federal Power Commission and, in the Roanoke Rapids case, the problem was carried all the way to the U. S. Supreme Court. In his legal brief, Mr. Chapman, then Secretary of the Interior, asserted that his interest in the case was "that of a competitor of Vepco in the sale of power . . ." The Supreme Court, in its decision in the Roanoke Rapids Case,[27] however, upheld the right of the private companies to develop such sites. In the Hells Canyon case, the new Secretary of Interior has withdrawn the objections of the Federal government to private development of hydro power on the Snake River.

The proposed Niagara River redevelopment is another case in point. Five investor-owned companies have banded together to construct hydro facilities at Niagara Falls. The opponents of private development have exerted much pressure in Congress to get the project for the Federal government. Though plans for private construction provide for the same results as construction by the Federal government with the added advantages of increased tax revenues, the issue remains deadlocked. Federal power advocates cannot even claim the issues of navigation or flood control to help them justify Federal development of this project.

Direct Federal competition and the interference with investor-owned utilities' expansion plans increase the risk which the utility equity investor must face. Direct competition between municipally-owned companies and investor-owned companies in some localities has the same result. Commissions should allow for these factors where appropriate by adjusting rates to reflect the increased risk.

If government pursued a strictly logical attitude, it would remember that monopoly has come to be regarded as the normal thing in the public utility field in order to produce the lowest cost of operation and the best service to the consumer, and, therefore it would not contemplate entering into competition. If we believe in government ownership of the utility industry, that is eventually what we can expect to have if direct competition from the government continues to grow. If, however, we still believe that investor ownership of public utilities under effective regulation fits best with the concept of a free-enterprise economy, we should ask the government to get out of the power business.

The Last 75 Years, in Summary

In summary, what has happened in the last 75 years of public utility regulation? The legislative phase established the authority of state regulatory commissions. The judicial phase was concerned with the economic results of regulation so that application of the decisions of regulatory bodies would result in an approximation of what happened in competitive industry. The administrative phase has been largely concerned with making regulation the universal application of accounting formulae, thus giving more consideration to expediency than to equity.

Since the mid-1930's, regulation has encroached more and more into the area of utility management. The pressure of Federal power activities, both from "yardstick" propaganda and direct competition, has taken its toll among investor-owned utilities. Increased taxation and the inflated economic system have created pressures which many regulatory commissions have been unwilling to face. Whereas, unregulated industry has been able to recoup increased costs by raising prices, the utility commissions have often found such price increases politically inexpedient.

The result of the U. S. Supreme Court decision in the Hope Case has been a major departure from sound economics in the decision-making of regulatory commissions. There has been a growing tendency to treat all utilities as marginal firms where no reward is allowed for differentials in management efficiency. In unregulated industry, profits are a measure of differential performance. If a "fair profit" in the utility industry is to mean some standard rate of return on capital, the incentive to progress and efficiency will be removed. The removal of such an incentive negates the American concept of profits which holds that society will be best served if those companies that are highly efficient are permitted to enjoy substantial profits whereas those that are passable in this respect might be expected to gain a moderate profit. Competition sees that such incentives are offered to unregulated industry. The regulatory commissions should see that the same incentives are given to the utility industry.

The courts have abdicated their review powers, except in instances of obvious inequities, on the presumption that the administrative bodies are able to make decisions in line with economic realities. This presumption does not hold as long as the formula concept of regulation gains unquestioned, and often unjustified, acceptance by the commissions.

The utility equity investor has had to bear the brunt of the inequitable regulation of recent years. Comparative figures for the unregulated industrials and the regulated utilities indicate the burden placed on the common stockholders of utilities. These figures show that the purchasing power of common stock earnings for industrial companies, on the average, had increased 28 per cent in 1952 over what they had been in 1940. In the same period for utilities, on the average, purchasing power of their common stock earnings had decreased 24 per cent. This is regulation which goes much farther than substituting for free competition.

What About the Future?

Now that we have seen what has happened in the first 75 years of public utility regulation, what can be done to improve regulation in the next 75 years?

First, we need to re-examine the purpose of regulation. As Americans, we have accepted the belief that a competitive economic system is better than any other. We have accepted the concept that the utility industry is naturally monopolistic. We have accepted the principle that a monopoly

27. U.S.A. ex rel Chapman v. Federal Power Commission, 345 U.S. 153; 73 S Ct 609; 97 PUR (ns) 129 (1953).

should be regulated because the normal competitive spur is absent. It logically follows then that the absence of competition, in the normal sense, is the only justification for regulation of public utilities. Regulation should be directed toward the accomplishment of the major functions of competition which include (1) promotion of technical progress, (2) promotion of efficiency, (3) regulation of profits, (4) lowering of prices, (5) promoting a better quality of goods and services, and (6) adjusting supply to demand.

When regulation does not accomplish these goals, it is poor regulation. When regulation goes beyond these goals and sits in the chair of utility management, it is in conflict with the economic principles upon which the nation is founded. It is then a step toward the planned society of fascism or socialism. I don't believe that Americans want such a society.

Second, we need to return to sound economics in regulation in order that the purpose of regulation can be accomplished. We must have trained people on the staffs of regulatory agencies: people who will be able to make decisions which reflect the economic conditions of the times; people who will search out the facts in each case and make findings in line with those facts; people who will reject the formula method of regulation as being too inflexible; people who will recognize that while equitable regulation is an extremely difficult task it is not impossible; and, finally, people who will see that the utility investor is not forgotten in the regulatory process.

Third, we should ask the Federal government to stop competing with investor-owned utilities. The inherent monopoly characteristics of the utility business makes this competition extremely wasteful. Continued growth of Federal competition can only lead to full public ownership in the long run, for private enterprise cannot long exist in the face of the special privileges granted to government enterprise. Though there are those who hope that the Federal government will eventually own and operate the utility industry, I firmly believe that the majority of Americans would find such ownership distasteful.

Fourth, the encroachment of the Federal agencies on the regulatory functions of the state commissions should be stopped. Federal regulation has its proper sphere in the regulation of interstate commerce. That is the sphere in which it should remain.

If we are to have regulation function as a substitute for competition, state commissions are the proper agencies to carry out that purpose. They know the problems of the companies they regulate. They also know their responsibilities to the consumers.

Today, we again have a changed political atmosphere in this country. The new Federal administration has indicated that private enterprise in the utility industry will no longer be a "whipping boy" for political purposes. This administration has stated often, and unequivocally, that it believes in private enterprise wherever private enterprise can and wants to do a job. As an example of this new thinking in the higher ranks of the Federal government, let me quote from a speech by Sinclair Weeks, Secretary of Commerce, made before American Iron and Steel Institute on May 28, 1953:

"When regulation departs from its traditional role and encroaches on the field properly allocated to management, it may well slow down the progress and development of the industries being regulated.

"This has happened and, as a result, the public has not received the best service at the cheapest price, which otherwise it could have received years ago.

"No group has been more unwisely and unfairly treated than the service industries. Yet the railroads, the power and light, the gas industries, and those furnishing communications employ millions of workers, dependent for livelihood on the success of these industries, which are vital to all other industry and to the general consuming public."

* * *

"In regulating utilities and in managing other things it is cheaper for the public in the long run to have those that serve it well-fed and strong, rather than half-starved and weak. There are ways of getting good service out of the strong. No one can get it out of the weak."

* * *

"If the regulated industries are to render their full services to the nation, it is my judgment that the regulatory bodies must allow earnings adequate to attract and support the equity capital they can use effectively for economics, improvement, and growth . . ."

The atmosphere in which regulation must operate has thus been cleared. Therein lies a challenge which we must meet. Let us help guide regulation into the proper channels where the sound application of the economic principles of the American system will result in equity for the investor and consumer. Let us educate the utility companies and the state commissions as to the purpose of regulation in a competitive society. In this manner, we will be able to help make the history of the next 75 years of public utility regulation one of progress and fairness to all concerned.

Lighting Dramatized

THE importance of good home lighting to modern living was dramatized recently in a 50-minute presentation at the Annual Convention of the National Association of Home Builders in Chicago. The show served a dual purpose in pointing out the value of lighting as a selling feature in today's homes and in commemorating the 75th anniversary of Edison's invention of the first practical incandescent lamp.

The presentation was the first on lighting ever offered as part of the main program of an NAHB convention. Presiding Officer N. F. Molnar introduced the show at the meeting's January 18 session, emphasizing that lighting offers a "real potential to the home-building industry."

Entitled "The Builders Jubilee with Light," the presentation was staged by Theatre for Industry, with a cast of 16 professional actors, and sponsored by the Electrical Industry Lighting Committee. The committee is made up of representatives of General Electric Co., Sylvania Electric Products, Inc., Westinghouse Electric Corp., and the Institute.

In announcing the presentation, Committee Chairman R. J. Miller stated that "The interest of the electric utilities and the light source manufacturers are identical with those of the progressive home builder."

"Both," Mr. Miller continued, "are concerned with the practical problem of bringing better lighting and, thus, better living at lower cost to more people. The dramatization will point up the inseparability of this partnership and chart the way to achievement of the common goals."

Bernard F. Braheney

BERNARD F. BRAHENEY, President and Director of Northern States Power Co. (Minn.), died recently at the age of 61 in a Minneapolis hospital after several months' illness. He had served the electric industry for almost 44 years.

He was first employed by Consumers Power Co., a predecessor of Northern States Power, in the Accounting Department at Stillwater, Minn., in 1910. Later he was connected with various divisions of the company and the general office at Minneapolis. In 1920 he left Northern States Power and joined Byllesby Engineering and Management Corp., later called Public Utility Engineering and Service Corp., with offices in Chicago. His duties there consisted primarily of financial and accounting counsel to various companies, including the Northern States Power Co. system. In 1936 he was elected vice president in charge of financing and accounting.

In 1942 he again became directly associated with Northern States Power at Minneapolis as vice president. In 1943 he became vice president and treasurer, the position he held until being elected president in 1947.

Active in trade association work, Mr. Braheney was a member of the Advisory Committee of the Institute and served on the Executive Committee of the North Central Electric Association.

Francis J. Gannon

FRANCIS J. GANNON, President of Tampa Electric Co., died recently at the age of 67.

Mr. Gannon's career in the electric industry began in 1902, when he was employed as a messenger in the offices of Stone & Webster in Boston, Mass. In 1904 he joined Dallas Power & Light Co. and during the following years moved to different parts of the country, working for Pawtucket Electric Co., Edison Illuminating Co., Sierra Pacific Power Co., and North Texas Traction Co.

In 1926 he went to Tampa, Fla., where he was made vice president and treasurer of Davis Islands, Inc. Two years later he joined El Paso Electric Co. in El Paso, Texas, as president. In 1931, having returned to Tampa, he joined Tampa Electric Co. as vice president and general manager. He became president in 1946, and under his direction the company began a broad expansion program which is still underway.

Chosen as Tampa's outstanding citizen in 1941, Mr. Gannon contributed much of his time and talents to work of the community and state. He served as president or director of many civic organizations, including the Tampa Chamber of Commerce, Florida State Chamber of Commerce, and the Florida State Fair and Gasparilla Association.

220 Industrial Engineers and Power Salesmen Attend National Electric Heating Conference

DESIGNED to facilitate exchange of the latest information, sales aids, and sales training ideas on industrial electric heating between manufacturers of heating equipment and companies supplying electric service, the first National Industrial Electric Heating Conference sponsored by the Industrial Electrification Council was held in Cincinnati, Ohio, on January 18-22.

The meeting, which was attended by 220 industrial engineers and power salesmen, was addressed by more than 60 specialists. Theory and process information covering the entire industrial electric heating field were presented by authorities affiliated with leading manufacturers; numerous case histories, together with sales aids, were given by experienced utility representatives; and discussion periods followed the reports.

J. R. Hartman, Chairman of the Industrial Electrification Council's Executive Committee and Vice President of The Cincinnati Gas & Electric Co., opened the conference.

"Because of the complexity of the broad field of industrial electrification," Mr. Hartman said, "and the feeling that the most pressing need, as well as the greatest opportunity, exists in the industrial electric heating field, the council decided to direct its initial efforts to that phase of industrial electrification.

"Study of this field," Mr. Hartman continued, "indicated the desirability of further limiting initial activity to metal sheath electric heating units and devices which, because of their tremendous field of application and many advantages to industry, offer the greatest opportunity for rapid attainment of tangible results."

Small electric heating units are a problem to electric companies and manufacturers, he pointed out. "In the aggregate," he said, "the potential volume, measured either in units or kilowatthours used, is tremendous. The unit sale, however, is so small that neither the manufacturer nor the utility can afford to have a man call upon the customer each time one of these units is applied.

"To meet this need," Mr. Hartman continued, "a training course has been developed by the Industrial Electrification Council. This course is designed to acquaint plant personnel with the advantages of these small electric heaters and to provide technical knowledge as to their application."

The course was previewed for conferees on the last day of the meeting. Consisting of a leader's guide, vugraph slides, and a text book, it covers basic principles of industrial electric heat, with detailed material on metal sheath heaters. It is intended for presentation at local levels over a six-day period.

"The extent to which this course is purchased and used by all segments of the industry," Mr. Hartman said, "will determine, in large measure, the production of future programs by the council."

Among the many other subjects considered at the conference were radiant heating; ovens and furnaces; induction heating; drying, finishing, and baking; galvanizing; enameling; melting; gas atmospheres; heat treating; brazing; heating nonmetallic materials; and controlling heat processes.

A conference address by Maxwell Cole, setting forth the objectives of the Industrial Electrification Council, appears on page 45 of this issue of the BULLETIN.

Industrial Electrification Council Objectives

Maxwell Cole

Manager, Market Studies and Service Division, Philadelphia Electric Company
Chairman, EEI Industrial Power and Heating Section

Extracts from an address before the National Industrial Electrical Heating Conference, sponsored by the Industrial Electrification Council, Cincinnati, Ohio, January 18, 1954

IF you agree "that experience has indicated the desirability of accomplishing maximum electrification of industry as a means of bringing about faster, cheaper, and better production of the things that make America great," which is a quotation from the resolution by which the Industrial Electrification Council was formed, then you will subscribe to its purpose, and this time I quote from its by-laws, "of developing a wider knowledge by American industry as a whole of the opportunities to increase production, improve quality, and reduce costs through the widest economic use of electricity."

Common Purposes

But, you ask, why is an Industrial Electrification Council necessary to do this? Aren't we all, manufacturers and electric companies alike, working to that end all the time? The answer to that question lies in an understanding of our common objectives in developing markets for our products, of the fields in which manufacturers and utilities operate, of the educational and promotional media which each uses in its field, and of the need for coordinating their efforts in order to obtain maximum results from them.

We are each interested in developing the widest possible market for our product — kilowatthours in the case of the electric company and industrial apparatus and equipment in the case of the manufacturer. But actually no industrialist is buying either of these just for the pleasure of buying it. He is manufacturing a product of his own, and he is buying that which will produce it fastest, cheapest, and best, and he will buy whatever he is convinced will do these things for him. Until he believes our products have a chance of accomplishing this, he won't even listen to us.

So we both, manufacturer and electric company, must start our market development by "developing a wider knowledge by American industry as a whole of the opportunities to increase production, improve quality and reduce costs through the widest economic use of electricity." When we have, as an industry, accomplished this, we will have automatically broadened our markets and opened many new doors to the sale of our own products.

In total the market comprises something over 250,000 industrial plants as classified by the U. S. Census. Actually, since in many plants no one man is responsible for all the buying, this market includes well over 1,000,000 individuals. To us as utilities, a certain number of these buyers, varying from only a score to a maximum of maybe 5000, depending upon our size, are our own personal customers and in many cases our friends. But to manufacturers, most of whom operate on a national basis, these customers become more a mass market, and I do not need to say that the method of approach to a personal customer is quite different from the approach to a mass market.

Differences of Approach

A very small proportion of industrial apparatus is sold by the manufacturer directly to the customer, by far the greater proportion being sold through engineers, contractors, distributors, and dealers or manufacturers of other products. In many cases, the manufacturer is one, two, or even more steps removed from the ultimate purchaser. Because of the size of the market, he must, in the main, use national media for its development and must rely on the coverage they give. Because of the system of distribution, he cannot reach all the market and is denied the opportunity, except in a relatively small number of cases, to use the personal approach in awakening an understanding of the opportunities which his product offers to an individual purchaser.

The electric company, on the other hand, is in exactly the opposite position. We operate in a restricted territory; so we are denied, for economic reasons, the use of the national media which are the chief reliance of the manufacturer. But we do have an advantage in that it is possible for us to make personal contact with every single one of our customers. As a matter of fact, my own company averages eight calls per year on our 5000 largest industrial and commercial customers. So we have an unequalled opportunity to present the story on a personal basis and to make use of other media such as meetings, educational courses, and direct-mail, which enable us to attain complete coverage of our part of the market.

Variety of Media

In approaching a market consisting of 250,000 enterprises and upwards of 1,000,000 people, we must realize that a wide variety of media are necessary to achieve effective coverage and results. Some people are impressed by technical articles, some by regular advertisements, some by pictures, some by personal contact, and some by physical demonstration. Each has his best angle of approach and, if our program is to be successful, we must use the entire range of available material. Some of this falls naturally in the sphere of the manufacturer, operating at the national level, some in the sphere of the utility working at the local level, but all must be used.

Is there any need to demonstrate the advantages of coordinating our usages of these various media, of making a balanced selection, of achieving complete coverage? Isn't it obvious that each of our efforts

will be more effective if it carries the same story, in the same way, and at the same time than if we scatter our shots, tell divergent stories, and miss the advantage of continuity?

That is the reason for the existence of the Industrial Electrification Council—to provide a vehicle where we in the utility business and manufacturers of industrial electric apparatus can coordinate our efforts to tell all American industry of the advantages it can gain "through the widest economic use of electricity."

Council Formation

The council has not sprung into being over night. Its inception was really back in 1946 when the EEI Industrial Power and Heating Section formed a committee for the purpose of developing better coordination between manufacturers and utilities in the field of electric heating. It received added impetus through several meetings held in 1948 and 1949 among various individual electric companies and manufacturers.

In 1950 a committee consisting of three representatives of the companies, appointed by the Industrial Power and Heating Section, and representatives of three manufacturers, who were invited to join, really got down to working out a method of achieving this coordination. Finally, on October 25, 1951, the Industrial Electrification Council, which was the outgrowth of the work of this committee, was formally launched by a group of six of the top sales executives of the three utilities and the three manufacturers. These six gentlemen now form the Executive Committee of the council.

From then until now we have been developing our program of action. Perhaps it has been slow, but the conditions resulting from the Korean war did not provide a propitious background for launching such a program and, even more important, we preferred to build slowly and soundly rather than hastily and, perhaps, faultily.

The council's first step in the very broad field of industrial electrification has been directed to industrial electric heating because we believe it is in that field that the greatest need for education exists and because we also believe it to offer the greatest opportunity for the expanded use of electricity and electrical apparatus.

Too often an industrialist who should consider electric heat stops at the cost of electricity and loses sight of the fact that the cost of energy is only one element affecting the final objective of faster, cheaper, and better production. Flexibility, controllability, space requirements, working conditions, and a host of other factors must be given proper weight in reaching the final decision, and we are embarked on a program to win proper understanding and consideration of all of these factors. With such an approach by industry, the potential markets for our products become limitless, and we may well see the time when our heating load approaches, or even exceeds, our power load.

It is our belief that the advantages of such a coordinated educational program can be so well demonstrated in the industrial heating field that the program will be expanded into materials handling, air-conditioning and refrigeration, power transmission, or such other fields of application as may require this type of educational work.

The National Industrial Electric Heating Conference is the first step in educating American industry—our own part of it—in the uses and advantages of electric heating.

"How-to" Course

The second step in the council's educational program is a course designed for presentation at the local level to customers, to contractors and engineers, and to fellow power salesmen. It is a "how-to" course starting with the fundamentals of industrial electric heating applications and carrying through on the principles and computations of selecting and applying electric heat to the many small heating problems which, with adequate training, can be solved by the plant electrician or engineer.

Obviously the great arc furnaces for metal melting, the big ovens, complicated heat treating processes, induction and dielectric applications do not fall in this category. So, the course will deal with small, simple problems which can frequently be solved easily by metal sheath heating units, strip heaters, cartridge heaters, and immersion units.

I commend the course for presentation to the people of your territory because it can produce several valuable results. If you can develop your customers' ability to make simple applications for themselves, without calling on your help, you will win more time to devote to other sales effort. If you can get them to do this for themselves, you are providing a source of automatic load growth—and, believe me, the electrician who is on the job all day, every day, can dig up ten times as many applications as you can on your sales calls, however frequent. And last, but not all or least, if you can get them using electric heat, finding out for themselves the many advantageous uses it has, you will have gone a long way toward eliminating the resistance met when the question of a large oven, an arc furnace, or an induction heating job comes up.

Other Courses Planned

These are the council's first two steps into the field of coordinated education of American industry. From here we hope to go on to the development of similar training courses in other fields of electric heating, to developing wider use of other types of educational material which are already in existence, of developing better material where it is needed, and of developing supporting advertising and promotion programs at the national level.

All the advantages of such coordinated effort are too numerous to mention, but I do want to touch on two. An educational program carried on at the national level will make your jobs easier when you make promotional calls, because the customer will have already gotten a better picture of the subject, and you can carry on from there. Such a program should also bring closer cooperation at the local level between you and the manufacturers' representatives, so that leads you may develop in your promotional work will be more promptly followed up and the installation of the equipment, without which we do not sell any more kilowatthours, will be accelerated.

This year we are celebrating the invention of the electric light, which launched our industry on its career 75 years ago. These 75 years have seen electricity become an integral

(*Continued on page* 52)

Probable Impact of Atomic Energy On Electric Company Securities

Eldred H. Scott

Controller, The Detroit Edison Company

An address before the Annual Meeting of the American Finance Association, Washington, D. C., December 30, 1953

THE welter of headlines heralding the new source of heat energy released by nuclear fission has raised many questions affecting the future of electric companies. The potentials afforded by the prospect of generating electricity from atomic energy must be causing the portfolio managers of our large insurance companies to pause and reflect on the future value of their electric company investments. Are these investments about to lose their traditional market stability? Are the managers' conclusions based on the trend of past results likely to be upset by unexpected developments?

If the managers remember that, unlike coal, gas or petroleum, electricity is a form and not a source of energy, their fears will be allayed. The quantity of information now available on the scientific and engineering problems of nuclear power is monumental. It is, in fact, fast becoming repetitious while awaiting the building and operation of a commercial reactor.

The Joint Committee on Atomic Energy of the United States has published two volumes of 649 and 415 pages entitled, "Atomic Power and Private Enterprise." The articles, speeches, and reports included generally cover problems of research and development, economics of design, construction and operation of atomic power plants, ownership of raw materials, the patent situation, and safety of personnel.

Little Heard from Investment People

Much has been heard from the physicist, chemist, engineer, politician, government administrator, etc., but little has been heard from investment people on the over-all financial aspects as they affect electric company securities outstanding and to be outstanding.

Coupled with the availability of all this published information, the recent statements by responsible government authorities that other nations, friendly and unfriendly, are getting ahead of us on industrial applications greatly arouses one's curiosity as to just what classified atomic information is available to those "cleared" by the F. B. I. An address by U. S. Atomic Energy Commissioner Thomas E. Murray early this month encouraged me in the preparation of this article, which I approached with much trepidation. His general theme was not to leave atomic energy to the expert, which he defined as "one who avoids the small errors as he sweeps on to the grand fallacy."

The purposes of this paper are served if we assume that electricity from nuclear power will be generated at less cost than by the use of other fuels. If it turns out differently, we can be sure that there will be little, if any, effect on the securities of electric companies. The only loss would be the amounts now being spent on research and development. (The assets of the 18 electric power systems in the Dow Chemical-Detroit Edison group total over $8,000,000,000.)

Nuclear power, if and when it can be used to generate electric power economically, will merely provide a new form of fuel. The reactor can replace only the boiler portion of thermal generating stations. The existing steam turbo-generators, transmission and distribution systems will still be necessary.

The hypothesis of decreased generating costs, however minute or considerable, greatly simplifies our approach. To date, no one can say what the final comparative results will be.

A conventional power plant costs in the neighborhood of $160 per kilowatt of capability today. Most estimates of generating cost arrive at about 7 mills per kilowatthour as typical for the whole country. This includes all fixed charges. In the reactor field estimates have been as high as $850 per kilowatt of capability. Even assuming greatly reduced fuel costs, few studies have come near the $300 per kilowatt believed necessary to make nuclear power competitive.

The electric industry has always been pegged as a high capital—slow turnover industry. The introduction of nuclear power with characteristics of higher capital outlays and lower fuel costs would be certain to accentuate this trait. Thus, we who are interested in the financial end of the business can be certain that there will be relatively more securities outstanding. Our analysis indicates that the owners of presently outstanding securities have little to fear from the application of nuclear power.

To date it has not even been suggested that nuclear power can be used directly at the consumers' premises. There has been some thought that perhaps some day a large industrial customer might find it economically feasible to have his own installation. Thus, our thinking for perhaps decades to come must be prosaically confined to a central station set-up with the conventional steam turbine and generator The only change brought about by the introduction of nuclear power would appear in the boiler room and fuel-handling facilities.

Maximum Conceivable Savings

With this thought in mind, let us look at the composite balance sheet and income statement of the whole electric industry (see following page) to appraise this area of competition between nuclear power and the fuels in present-day usage.

Since we are considering the financial problems of insurance companies, the liability side of the utility balance

sheet is also presented. Holdings of these securities are, of course, among the principal assets of the insurance companies.

This balance sheet shows a good quantitative relationship with about a 50 per cent debt ratio. It will also be noted that the "boiler plant equipment" account, the only account affected by the introduction of nuclear power, is covered 4.5 times by the "equity" account.

If we assume that the primary aim of the bond purchaser is to avoid trouble rather than to protect himself in case of trouble, the introduction of any cost-reducing device should give him more security even if it does involve some write-offs in the property back of his lien. Thus, the enterprise is operated more efficiently, and his claim against the business as a whole is strengthened. A mortgage lien can never be entirely independent of the success of the business itself.

Under the most ideal conditions which can be premised today, the elimination of all fuel cost defines the maximum limit of savings presently conceivable. If we disregard the seemingly certain higher fixed charges, the foregoing income statement shows the maximum area of cost reduction to be about 14 per cent of revenues.

The impact of nuclear power on the domestic and small commercial classes can never be of much moment because so much of their costs are allocated to transmission, distribution, and customer service expenses. They pay about $.03 for a kilowatthour of energy, of which about one-half cent is the actual cost of fuel. A saving of a few mills would probably have little effect under today's usages.

If we were to trace the background of most utility executives, we would see that the power plant operators have always been in the forefront of the electric industry, although their bailiwick represented less than one-third of the investment and operating costs. Perhaps this is because power generation is rather glamorous and the performance and properties of the operators lend themselves to more precise and comparative measurement than the other branches of the business with their minuscule parts.

Due mainly to rapid expansion, characterized by doubling output every ten years, electric power people have had to keep closely in touch with all new developments. In order to hold down costs and be competitive, they have had to participate jointly with each other and the manufacturers in promoting advances in technology. There are over 60 active committees in our trade associations which cover all phases of operation. These committees usually meet about three times a year, and one of their main objectives is the reduction of costs. Already there are several committees active in this new field of nuclear power.

In order to paint the backdrop for this new source of energy, I asked our power plant design engineers to give me a briefing on their cost reduction progress and developments over the years. Following is a tabular summary of their report:

Continuous technical improvements have lowered both costs and prices, but even now the most efficient steam plants convert only about 38 per cent of the heat in the fuel into electric power. There has been much talk that conventional steam units may be approaching the practical economic limits of efficiency. It is thus little wonder that our power plant design engineers and graduate executives have seized upon atomic energy to meet this challenge to their record of continuous routine cost reduction.

The atomic furor and studies have been almost exclusively over the plant of the future. Our insurance company friends are prudently more concerned over the plant today which forms the

COMPOSITE BALANCE SHEET (1952)—ELECTRIC COMPANIES IN THE UNITED STATES

Assets		Per Cent of Total	Probable Change With Nuclear Power
Boiler Plant Equipment	$ 2,405,861,000	8.1	Up Considerably
Other Steam Production Plant	4,089,163,000	13.7	No Change
Hydraulic and Internal Combustion Plant	1,895,753,000	6.3	No Change
Total Electric Production Plant	$ 8,390,777,000	.....	
Transmission and Distribution Plant	11,861,014,000	40.0	No Change
General and Other Electric Plant	2,715,159,000	9.2	No Change
Total Electric Utility Plant	$22,966,950,000	.....	
Other Assets Including Other Utility Plant	6,719,231,000	22.7	No Change
Total Assets	$29,686,181,000	100.0	
Liabilities			
Capital Stock and Surplus	$11,396,128,000		
Long-Term Debt	10,809,393,000		
Depreciation Reserve	5,105,588,000		
Other Reserves and Liabilities	2,375,172,000		
Total Liabilities	$29,686,181,000		

COMPOSITE INCOME STATEMENT (1952)—ELECTRIC COMPANIES IN THE UNITED STATES

		Per Cent of Revenues	Probable Change Under Nuclear Power
Utility Revenue	$6,549,164,000	100.0	Up
Steam Power Expense—Fuel	906,178,000	13.8	Down—approaching zero
Steam Power Expense—Other	316,745,000	4.8	Up Considerably (?)
All Other Operating Expense	2,203,782,000	33.6	No Change
Depreciation	562,448,000	8.6	Up
Taxes	1,345,144,000	20.6	Up
Available for Interest and Dividends and Reinvestment	1,214,867,000	18.6	Up

POWER PLANT COST REDUCTION PROGRESS

	1900	1925	1953	Next
Conservation of Fuel—Pounds of Coal Per Kwhr (Based on 11,700 Btu Per Pound)	5.20	1.40	.77	.72
Conservation of Engineering Materials (Pounds of Material Per Kw of Generator Capability)	79	18	14	13
Steam Pressure—Psig	110	400	2,000	4,500
Steam Temperature—Degrees F	350	700	1,050	1,150
Larger Size Individual Units—Kw	50	40,000	260,000	....
Greater Usage of Equipment—Utilization Factor (Per Cent)	36	51	56	....

security back of their present large holdings of electric utility debt. The problem of investing or not investing in the nuclear plant of the future can be solved when, as, and if an offering of this type is ever made.

The consideration of past or "sunk" costs gives the investor added assurance that nuclear power will never be able actually to replace the conventional plant except as it wears out or maintenance and operating costs become prohibitive due to the age of the equipment. A change-over would only be feasible if the nonfixed or variable costs of the conventional fuel plant exceeded the total costs of the nuclear plant.

The handling of superseded and obsolete plant for rate-making purposes has long been a problem with gas and telephone companies. In the electric industry the advancement in the art has been steady, but heretofore it has lacked spectacular and radical progress items such as the introduction of natural gas in the gas industry and automatic dialing in the telephone industry. Perhaps the introduction of nuclear power will be just that in the electric industry.

Precedents Should Allay Fears

Regulatory precedents in the gas and telephone field should allay any fears as to the ability of most electric companies to recover from customers any large write-offs of property because of the introduction of nuclear power. Utilities could easily prove that their property losses were caused by unforeseen occurrences. If it were otherwise, progress would be stopped and expansion would be hindered.

In a situation where a gas plant was suddenly superseded by the adoption of a new process, the Supreme Court of the United States held that the lower court should have allowed in the rate base the unamortized cost of the superseded plant. (Pacific Gas and Electric v. San Francisco 265 U. S. 403.) Excerpts from the opinion follow:

> I have referred several times to plaintiff's contention that obsolescence should be amortized after, rather than before, abandonment of a unit of plant. Specifically applied, it is urged that when it is seen that Martin station or other obsolete generator has been superseded by new Jones generators, using the improved Jones process for oil-gas, *the demonstrated economies thereby effected are justly to be devoted to reimbursing the company for the loss of capital occasioned by the obsolescence, continuing each year until the loss is made good, with interest.* On this settled program the new generator would, of course, be rated for return at replacement cost new at all times. To give the consumer a part of the advantages of the improvement, the company proposes that only half of the very considerable economies of operation shall be devoted to its reimbursement. Many advantages are urged for this plan: That it throws upon the consumer, who has the benefit of the new equipment in the shape of reduced charges, the burden of the loss by supersession of equipment (410) otherwise in good condition; that it avoids the defect that is inherent in a system of setting aside reserves in advance of abandonment—namely, that while the life of a depreciable unit is difficult enough to estimate when physical decay alone is considered, it is practically impossible to forecast when we consider that obsolescence and inadequacy, which usually account for abandonments in a gas manufacturing plant, follow no rules as to time of their operation; that, finally, progress in service is promoted by giving a gas company an incentive to improvement of its machinery and its processes in the shape of increased profits. It must be admitted that if replacement of an old machine has not been sufficiently provided for by reserves in advance, a company will naturally defer installing a new machine, and so progress is halted. . . . (Emphasis added.)

No responsible person has suggested that nuclear power itself can ever become available on individual customer's premises other than those of very large power consumers. Even if it did become available through some presently unthought-of method, our customer would still have the problem of generating electricity for most of his daily living and his work requirements. As nuclear power is exclusively a heat energy, it might turn out to be more of a competitive problem to our gas and oil friends than the electric industry.

Cost—Main Factor to Industries

It is perhaps little realized that the nature of the utilization process makes it imperative to use electricity in certain items in the home and factory. In the heating items where electricity is somewhat competitive the decision as to which form of energy will be utilized in the factory depends mainly on cost alone, whereas cleanliness, cost, and many other factors predominate in the home and small commercial business.

If the insurance company investor in electric company securities still has any doubts as to the future value of his holdings, he can obtain solace from the figures below. Today's customer with a reactor in his basement would still have to generate electricity for 60 per cent of his requirements, and if he had an all-electric home he would have to generate 4,350 kwhr or

ANNUAL ENERGY USE IN THE HOME

	Today's Average Customer		All-Electric Home	
	(Kwhr)	(Per Cent of Total)	(Kwhr)	(Per Cent of Total)
Electricity Used as Such				
Lighting	700	(30)	800	(3)
Motor Appliances (Washers, Refrigerators, Freezers, Air Conditioners, TV, Radio, etc.)	700	(30)	3,550	(15)
Sub-Total	1,400	(60)	4,350	(18)
Electricity Reconverted to Heat Energy:				
Space Heating (Panel)	...	...	12,000	...
Water Heating	...	...	4,000	...
Range	...	...	1,290	...
Clothes Dryer	...	...	780	...
Incinerator	...	...	660	...
Other	...	...	920	...
Sub-Total	940	(40)	19,650	(82)
Total Home Usage	2,340	(100)	24,000	(100)

almost twice the average home usage for his total requirements of 2,340 kwhr as of today.

Another point in favor of the stability of the domestic customer, come what may, is his large investment in utilization equipment. This amounts to well over $1,000 for the average customer. His fixed charges on this sum are about $100 per year contrasted with his bill for electricity of $60.

In the industrial portion of the electric business we also find a great dependence on electricity as such. Its versatility and convenience are making it more important to industry.

ANNUAL ELECTRIC ENERGY USE IN INDUSTRY, 1946, IN PER CENT

	Electricity Used As Such			Electricity Reconverted to Heat Energy and Miscellaneous	
	Lighting	Motors	Electrolytic Cells	Furnace	Other
Total Industry	7.7	63.2	13.1	13.7	2.3
Automobile	19.4	68.0	0.2	7.3	5.1
Iron and Steel	7.2	72.0	0.4	18.7	1.7
Nonferrous Metals	2.5	20.2	61.3	14.6	1.4
Chemicals	4.5	44.7	21.9	27.9	1.2
Paper	3.9	93.1	2.2	0.2	0.6
Mining	4.0	93.7	0.1	....	2.2

Source: F. P. C. Summary of Industrial Electric Power in U. S.

Seemingly one of the things to come from any introduction of atomic energy will be fairly uniform fuel costs. This is contrary to the situation today. Thus, fuel will have the same mobility enjoyed by the capital controlled by the insurance people. This should affect various utilities differently. Perhaps, coming from Detroit, I am somewhat biased, but I believe that "come the day" I would rather have my money invested in a company serving an industrial fabricating area. The nation has discovered time and again that people generally are not too mobile as to their place of residence. The factories and materials must be brought to them.

Securities Investors Fortunate

Investors in utility securities are fortunate in that no complacency has developed in the electric industry. It has recognized its responsibility for everything having to do with the production and distribution of electricity and in the improvement of the art relating thereto.

The outstanding feature in the economic history of electric companies has been their ever readiness to adopt new and improved technologies. Their eager approach to the new nuclear energy resource augurs well for the owners of electric company securities. The eventual commercial feasibility of nuclear power has been generally accepted for a long time. There has even developed a healthy competition among utilities as to methods of development.

Among the earliest entrants in the field was my own company, Detroit Edison, which teamed up with Dow Chemical. There were three other groups having similar contracts with AEC. Their early objectives were (1) to determine the engineering feasibility of designing, constructing, and operating dual-purpose reactors to produce fissionable material and power and (2) to examine the economic and technical aspects of building such reactors. It is estimated that the groups spent collectively approximately $1,000,000 in making their studies and reports.

These reports call attention to many different reactor designs that might be followed. All four groups concur in the belief that dual-purpose reactors are technically feasible and could be operated in such a fashion that the production and sale or use of plutonium would reduce the cost of electric power. Conversely, it is generally agreed that no reactor could be constructed in the very near future which would be economical on the basis of power generation alone. This will certainly be true except perhaps in remote areas where conventional fuels are expensive and transportation difficult.

With regard to the question of government participation and aid in the development of the future reactors, the groups vary widely in point of view. The Dow Chemical-Detroit Edison group believed that the government should aid the program only through research during the design and development stages. After that point the financing and ownership of the reactor should rest in private hands. The other groups favored more government guarantees.

There are now 30 electric companies involved in nuclear power studies. Eighteen of these companies are associated with the Dow-Detroit Edison group, and the balance are working with other engineering chemical and construction firms.

The Dow-Detroit Edison group is now in its second-phase study of nuclear power. This consists of a preliminary design of a reactor believed to be most appropriate for commercial application. The following nonutility firms are part of the group: Dow Chemical Co., Allis-Chalmers Manufacturing Co., Babcock & Wilcox Co., Bendix Aviation Corporation Co., Gibbs & Cox, Inc., United Engineers & Constructors, Vitro Corporation of America, and Ford Motor Co.

Nuclear Power Company Formed

Only this month four electric companies and an engineering firm filed incorporation papers in nine states for Nuclear Power Co. This study group is composed of American Gas and Electric, Commonwealth Edison, Pacific Gas and Electric, Union Electric, and Bechtel Corp.

The electric industry has been one of the leading growth industries. Due to the impact of regulation, the benefits to security holders of this growth have been moderate. It is entirely possible that this picture could be changed if the suggestion made before the convention of utility commissioners on September 22, 1953, by W. L. Davidson, Director, Office of Industrial Development, AEC, is followed.

After discussing the possibilities of government operation or a joint government-industry undertaking, Mr. Davidson developed the following third possibility "which envisages a nonutility type of venture financed entirely by private capital. I use the nonutility term here in a generic sense, rather than intending to specifically exclude utilities from participation. But since there is admittedly a substantial risk involved here, there must perforce be a greater opportunity for reward. If utilities are to participate, either the regulatory

bodies will have to adopt less rigid boundaries as to what constitutes valid risk and return for utility activities or else a large number of utilities might combine their efforts with the pro-rated costs not considered to be of such magnitude as to constitute an abnormal risk. . . . If the power produced was distributed by a utility, the purchase price between the utility and the plant owner would become a matter of interest to the local utility commission and presumably would be set at a figure close to that paid for conventional power of equivalent firmness. If by-products of the reactor could be marketed advantageously, the return on this venture might be in excess of that normally permitted utility operations."

Only One Threat to Securities

At this moment the development of nuclear power offers only one threat to the safety of outstanding electric company securities. This one threat is government competition which could conceivably force private enterprise from the business of generating power.

Almost one-fifth of the total power generation in the United States is by government-owned plants. Twenty years ago it was only about one-twentieth. This change came about mainly through the Federal government's claim that only it could develop large hydroelectric projects because of their size and other involvements. In rebuttal, witness the recent sale of two security issues by two of our leading corporations backed only by their faith and credit which total an amount greater than the net investment in the TVA or the Bonneville and Grand Coulee developments combined. The involvements of public street occupancy by lines of the Bell System and the products of General Motors have been solved over the years with no encroachments on private enterprise.

The recent decision by the Atomic Energy Commission to go ahead with the construction of a $100,000,000 nuclear power plant as a government power project is a repetition of the philosophy expressed in the Thirties on the hydro projects—"the matter is urgent and it costs too much to make it practical for private development." This is a step in the wrong direction which could do great harm to insurance company investments in securities of private-enterprise electric companies.

Art. I, Section 8, of the United States Constitution states that "The congress shall have the power . . . To promote the progress of science and useful arts, by securing for *limited times* to authors and inventors the exclusive right to their respective writings and discoveries;" (Emphasis added.)

Little did the founding fathers realize that an "inventor" of a revolutionary idea could turn out to be the Federal government itself. And little is it realized today that the first self-sustaining nuclear reactor was demonstrated at the University of Chicago over ten years ago.

The early American patent system was based on the resourcefulness and initiative of individuals. Little monopoly arose because improvements were not radical enough to enable an inventor to monopolize an entire industry. Markets were local. With the growth of the large corporation and the progress of science, invention in the 20th century became a corporate or group process. With the invention and development of nuclear power by the Federal government itself, an entirely different type of inventor group has arisen. To date, the patentee has not specified exactly what it has discovered except to the chosen few cleared by the FBI. If the United States is to have a well-adjusted economy and dynamic technology, under our constitution sooner or later the production of electricity by fissionable material will have to be turned over to private enterprise on a licensing basis. A fair royalty would be the market value of using the patent, although some may want to collect the billions spent by government for war purposes.

It would seem that if the constitution is observed, electric companies will eventually be safe from this one threat which is government ownership.

Outlook for Securities Optimistic

The tenor of this general appraisal of the outlook for electric company securities as effected by developments in the atomic field is one of considerable optimism. If these developments do not prove a boon to industry, the only loss will be the cost of research and other expenses, all of which are relatively minor in comparison with the resources of the interested corporations.

If we are presently approaching the end of a long boom, it is quite assuring that we have progressive electric power managements who are actively seeking new earning power and increased efficiency. The great companies of today have been built on research and private initiative.

The trend of the expenses with this new process is also important to investment people. Utilities will require a relatively larger investment, thus tending to firm up interest rates. Operating expenses will be decreased, at the same time increasing the functional importance of trained manpower. The individual should have relatively more money to invest in insurance.

The only shadow on this whole intriguing project is the heavy hand of government and its place in the private-enterprise system. If this can be resolved, as we believe it will, utility securities should be looked upon with continued favor for many years to come.

EEI Publications

The Rural Representative and His Job

EEI Farm Electrification Manual, Section 1—Revised, copyright 1953. 12 pages. Prepared by the Farm Section of the EEI Commercial Division. Price: 25 cents. 40 cents to nonmembers.

This introductory section of the Farm Electrification Manual is intended to be of help to the farm service representative in his work of guiding the farm family toward more efficient farming and better living conditions. Originally published in 1946, the manual is a continuing project which now consists of 17 sections. Revisions of individual sections are made as new equipment and new farming methods make old practices obsolete.

The Development of Farm Electrification

EEI Farm Electrification Manual, Section 2—Revised, copyright 1953. 12 pages. Prepared by the Farm Section of the EEI Commercial Division. Price: 35 cents. 50 cents to nonmembers.

A brief history of farm electrification is presented in this section, which has been revised to include recent progress as a part of the long and interesting story of the revolution in farming made possible by electricity.

Conference to be Held in Paris Next May

THE International Conference on Electric Systems (CIGRE) will meet in Paris, May 12-22, 1954, at which time more than 100 papers on electric utility system design and operation will be presented to an audience of electric utility leaders from all over the world.

CIGRE, which was founded in 1921, is the world's largest international electrotechnical organization, having nearly 1800 members from 41 different countries. The group meets biennially to discuss technical developments in generation and transmission and, as such, represents the best thinking and experience of eminent power specialists around the globe. It is expected that approximately 1400 members and guests will attend the forthcoming conference.

The U. S. National Committee, for its participation in the technical program, has selected the following ten papers to be presented at the meeting:

"The 330-Kv Systems of the American Gas and Electric Co.," by F. A. Lane, G. H. Kinghorn, and F. M. Porter.

"The OVEC Project," by Philip Sporn and V. M. Marquis.

"High-Voltage Impulse Tests on Transmission Lines and Substations," by I. W. Gross and C. F. Wagner, American Gas and Electric Service Corp. and Westinghouse Electric Corp., respectively.

"The Use of Transformer Models for the Determination of Transient Voltages," P. A. Abetti, General Electric Co.

"Electronic Relaying Provides Faster Fault Clearing and Improves Stability," by L. F. Kennedy, General Electric Co.

"Electrostatic Stress Control of Insulators and Line Hardware at Extra High Voltage," by J. M. Sheadel, Ohio Brass Co.

"The Effect of Generator Voltage Regulators on Stability and Line Charging Capacity," by F. S. Rothe, General Electric Co.

"230-Kv Series Capacitor Installations on Bonneville Power Administration's System," by C. A. Demuth and E. J. Harrington, Bonneville Power Administration.

"Synthetic Resin Impregnated Mica Insulation for Large Rotating Machines," by G. L. Moses and John C. Botts, Westinghouse Electric Corp.

"A Simple Relay Scheme for Unit Generator-Transformer Station," by George Steeb, Niagara Mohawk Power Corp.

Anyone in the electrical industry in the United States who is interested in the program and wishes to attend the 1954 convention will be welcome. The registration fee for nonmembers is 20,000 French francs (approximately $57.50) which should be forwarded to CIGRE, 112 Boulevard Haussmann, Paris. The meeting place will be at 28-bis Rue St. Dominick (The Foundation Berthelot), a central location easily accessible from most popular Parisian hotels. Further information may be obtained from I. W. Gross, Secretary-Treasurer, CIGRE, care of American Gas and Electric Co., 50 Church Street, New York, New York.

Chairman of the U. S. National Committee is Frederic Attwood, Vice President of the Ohio Brass Co. At the annual meeting of the committee in New York on January 18, Mr. Attwood was elected honorary Chairman of the group, and Philip Sporn, President of the American Gas and Electric Co., was elected Chairman; Howard Melvin, Chief Consulting Engineer for Ebasco Services Inc., Vice-Chairman; and I. W. Gross, American Gas and Electric Co., Secretary-Treasurer. The new officers will take over the U. S. phase of CIGRE operations at the conclusion of the 1954 convention.

Institute Approves Armour-Research Study On Connectors Between Aluminum and Copper

THE increasing use of all-aluminum conductors in the overhead plant, particularly in the distribution system where numerous connections between aluminum and copper conductors are involved, has created some new problems in securing satisfactory joints.

A Subcommittee on Aluminum Conductor Fittings of the EEI Transmission and Distribution Committee has been studying this matter for some time. The subcommittee found that corrosion failure of connectors for joints between copper and aluminum has been experienced in a number of areas throughout the country after relatively short periods of service. The wide variety of connectors being made available and the lack of an adequate background of experience on their ability to meet a range of service conditions posed a difficult problem.

It was the conclusion of the subcommittee that a comprehensive research project which might require cooperation of the various interested groups in the industry would be desirable to develop the fundamental engineering principles for the design of connectors for aluminum conductors, with particular reference to joints between aluminum and copper conductors. As a preliminary to such a project it was proposed that a brief study be made to define better the exact nature of the field troubles with connectors and to review the state of the art as to areas of agreement and disagreement, so that there might be established a systematic program for the solution of the unsolved problems associated with the use of connectors for aluminum conductors.

Institute approval has been granted for this preliminary study, and arrangements have been made to utilize the facilities of Armour Research Foundation in carrying out this work, which is expected to be completed by June, 1954.

IEC Objectives

(*Continued from page* 46)

part of all phases of American life. Electrification of industry has made possible the production which has raised our living standards to their present level and which has enabled us to defend ourselves in two great wars.

What will the next 75 years bring? Science promises even greater possibilities than in the past, but their realization will depend to a great extent upon the degree to which we in the electric industry, manufacturer and electric company alike, retain our aggressive spirit and pull together to see that American industry makes the most of the opportunities that complete electrification of industry offers.

The 8-ton Fruehauf trailer, housing Consumers Power Co.'s "Easy Does It" kitchen, was specially built to tour the company's 28,000 square mile service area. The interior of the 40-ft van was custom-designed by the company's Display Department.

A Handicapped Homemaker's Kitchen— On Wheels

L. L. Clemmer
General Home Service Supervisor, Consumers Power Company

ONE of the long-range, extra-curricular projects sponsored by the electric industry since World War II has been that of developing a program to assist the physically handicapped homemaker in the daily performance of her usual household duties. The war and its resulting disabilities have made America aware of the progress achieved in the field of rehabilitating and returning the disabled veteran to a useful place in the community. The tremendous need for a similar program in the field of disabled homemakers has become more widely recognized because of the veterans' program.

We are told that of all the disabled people in America the largest single occupational group is the housewives and that they number about 10,000,000. Their physical limitations are largely the result of heart disease, polio, tuberculosis, arthritis, spastic paralysis, and amputations. Some of these women can do their homemaking work only when seated in a wheel chair. Others, because of the need for braces or crutches, must stand for all tasks.

Dr. Howard A. Rusk, through his work at the New York University Bellevue Medical Center, brought a realization to leaders in our industry of the need for an educational program that would show how kitchens might be arranged and equipped to make the work of handicapped homemakers easier and more pleasant.

Justin R. Whiting, Chairman of the Board of Consumers Power Co., was among the industry executives who saw an opportunity for electric companies to serve a public good. Through his interest, our company became one of the group of utilities to sponsor and assist in financing a research group to explore the subject of rehabilitation for the handicapped housewife. As a result, financial assistance was extended to a program already in progress under Dr. Rusk's direction at Bellevue Medical Center.

Dr. Rusk's program endeavored to demonstrate how the disabled homemaker might live and work within the limits of her disability and resume her rightful role in the family. Study and evaluation of the basic problems of work simplification, proper kitchen and laundry planning, and location and working heights for cabinets, sinks, and appliances were particular portions of the program of immediate interest to the electric industry.

In March, 1952, an evaluation seminar was held by Dr. Rusk for representatives of the utility companies who had joined him in his program. Consumers Power Co. was represented at that seminar by our Home Service Supervisor. Following her report of progress as demonstrated to the group, Mr. Whiting presented a challenge to those company associates in charge of long-range promotional planning to do something concrete.

How might a company such as our own present the information thus far available to our customers, including both the disabled and the normal homemaker? A number of suggested activities were proposed.

1. We could train one or more home-service advisors to work among handicapped homemakers, either in their homes or in institutions.

2. We might build a kitchen incorporating work simplification ideas and suggestions for the assistance of heart, polio, or arthritis sufferers, in one of our company buildings or donate such a laboratory kitchen to one of the hospitals or colleges in our area.

3. We could accomplish parts of both of the first and second suggestions and in addition make the information available to more of our customers if we built a mobile unit that could be moved throughout our service area.

The last suggestion caught the imagination of our management. The result is a trailer which we named our "Easy Does It" Kitchen. It was completed and first shown to special groups of industry people, the press, and workers in the field of rehabilitation of the physically handicapped during the autumn of 1953.

Miss M. A. Bettesworth, General Home Service Supervisor, at counter-top range, between sink and raised oven. Seven work centers make up "Easy Does It" kitchen.

We felt that there would be several types of showings to which the "Easy Does It" Kitchen would be adaptable. One would be the mass type, to include county fairs, home shows, or street showings in the towns and cities we serve. Further, we felt that its appearance at meetings of home-economics teachers, extension workers, medical groups, nurses, and technicians' associations would result in interested visitors. It also seemed that with "Easy Does It" we could successfully visit institutions such as county tubercular sanitoriums, hospitals, colleges, and schools, especially those having courses in home management and economics.

Immediately after its completion, "Easy Does It" was introduced to some of the leaders of the electric industry at the annual meeting of the Association of Edison Illuminating Companies at White Sulphur Springs, W. Va. A "shake-down cruise" followed, during which company personnel concentrated on learning how the mobile kitchen could be displayed and demonstrated most effectively.

In a period of approximately six weeks "Easy Does It" experienced 22 days of public showings. An average of 206 people visited it each day or a total of 4500 visitors. There were 11 days with special professional groups, four days of street showings in Flint, one of the larger cities in our service area, and four days at a county fair, plus three days at the AEIC meetings in White Sulphur Springs.

Miss Bettesworth sits at the mixing center. The trailer has a 200-amp, 240-v entrance and 26 circuits. Water pumped from 250-gal tank serves sinks, laundry and dishwasher.

Results of the Cruise

From the "shake-down cruise" we have learned several things.

1. That there is a real public interest and desire to learn of ways that homemakers with extreme or partial disabilities can be helped.
2. That the mass showing cannot be handled as a "parade" through the trailer.
3. To satisfy visitors properly, groups of ten or 12 people can be handled at one time, with a well-posted guide to explain the trailer's features.
4. That the groups average from 20 to 30 minutes for each inspection.

5. That many visitors want plans of the various work centers to use in building or remodeling their own kitchens and laundries.

6. That more people are required to man the exhibit than was anticipated — this because of the strain and exhaustion experienced from telling and retelling the story to a constant stream of visitors. We have found that frequent relief has to be given these employees and that even then it is difficult to operate more than six hours each day.

There are undoubtedly other things to be learned, methods of showing to be studied and tried before we perfect a satisfactory pattern for handling these mobile showings to our customers. We do feel, however, that the early experience has been, on the whole, successful and that we have a workable display.

A schedule of 1954 showings in the 12 divisions of the company, covering 63 of the 68 counties in lower Michigan, is being arranged. It will include all of the larger cities as well as many of the smaller towns served by our company. Since the equipment is an operating unit as to cooking, freezing, laundry and other functions of a home kitchen, requiring plumbing, water supply and food disposal, we can, in Michigan, operate outdoors successfully for about nine months of the year. Weather conditions in the winter make indoor showings preferable. Fortunately, there are in Outstate Michigan a number of field houses, arenas, and company service buildings where interested groups can inspect the kitchen in comfort even during the coldest weather.

The trailer proper is a specially built Fruehauf model of the type commonly used by cross-country furniture moving companies. It has a total over-all length of 40 ft. The total loaded weight of the trailer on the road is slightly less than 8 tons. The tractor which hauls the trailer is a GMC cab-over-engine model, equipped with the usual safety devices required of common carriers. The total length of trailer and tractor is 49 ft, 6 in., which is within 6 in. of the maximum length allowed by most state highway departments. Since the 40-ft trailer itself is 5 ft longer than our state regulations allow for any one vehicle in a train, it was necessary to obtain a special over-length permit allowing us to operate as an educational exhibit and one not hauling for hire.

The interior of the trailer was planned and custom-built by the Display Department of the company with counsel and advisory assistance from the Home Service Department as to the work simplification and physical handicap features of the display. The appliances to be used were selected for features of design that offered a practical solution of the problems of a handicapped housewife.

Work Centers

The floor plan includes seven basic work centers, namely, rest and planning, mixing, clean-up and serving, range, freezer, cleaning supplies and storage, and laundry. Each of these work centers is an operating unit. On board, either in use or ready to function, are a two-temperature refrigerator, an upright home freezer, a sectional electric oven, and separately located four-in-line surface burners. There is also a combination automatic washer and dryer, undercounter dishwasher, food disposal unit, folding ironer, cannister type vacuum cleaner on wheels, and an electric roaster. In addition, there is a complete list of table and kitchen appliances, including the iron, mixer, waffle iron, coffee maker, toaster, blender, and table model radio.

All work centers are equipped as they would be in an actual kitchen or laundry.

The rest and planning center includes a sofa, desk, radio, and telephone.

The mixing center has its refrigerator, wheeled cart, sit-down work space, bins for flour and sugar, shelves of staples and spices, fold-away mixer shelf, storage for baking utensils, waist-high oven, and posture-supporting swivel chair. These allow the homemaker to prepare for baking or roasting with no reaching to exceed 24 in.

The clean-up and serving center contains sink, dishwasher, garbage-disposal unit, cabinets, and cupboards stocked with dishes, silver, linens, and table appliances.

The range center has its surface burners, a snack bar, storage for cooking utensils, supplies in pull-out or counter-balanced bins, and cupboards—all accessible with practically no steps for the homemaker.

The freezer center consists of a second sink, freezer, work counter, storage space, and single-surface burner. An adjustable chair is provided for sit-down work at either the counter or lower level of the sink and surface burner.

Kitchen van stayed at Michigan's Hillsdale County Fair for four days during six-week "shake-down cruise." During test tour a total of 4500 visitors saw kitchen.

The cleaning supplies and storage center demonstrates the convenient housing of special aids to the handicapped homemaker. Included at this point are specially selected items such as a cellulose mop with lever handle for easy moisture removal, push-type broom, long-handled dust pan, vacuum, and cleaning tools. A second section of this center allows for storage of bulky utensils and reserve stocks of canned goods.

At the laundry center is the washer-dryer combination, mounted at a special height to allow for wheel-chair use. Surrounding it are such work-saving items as a folding ironer, laundry cart, sit-down ironing board, tilting soiled-laundry bin, and clothes-sorting counter.

Thus are demonstrated the ideas we wish to leave with our customers as to how the physically handicapped may conserve their limited resources of energy or practice less tiring ways of doing their kitchen and laundry work. Of course, it is obvious that what is an essential way of doing many of these tasks for a handicapped homemaker is often a very desirable way for a normal person. Therefore, we expect our "Easy Does It" Kitchen to be not only an answer to the problems of the disabled but also a lesson in energy-saving homemaking techniques for every visitor.

A few behind-the-scenes operating features may be of interest. A 200-amp, 240-v entrance serves the trailer. There are 26 lighting and special purpose circuits. A tank carrying 250 gal of fresh water serves the two sinks, dishwasher, disposal unit, and automatic laundry. Pressure is provided by a rotary electric pump. Drainage is handled by sump pumps mounted below the floor. A second 250-gal tank accumulates the waste water. A 50-gal storage water heater provides a constant supply of hot water for kitchen and laundry use.

Two wall-type fan-circulated space heaters warm the trailer on chilly or inclement days. Three ventilating fans furnish a change of air every 2 min. To provide additional comfort during the hot summer weather, walls and ceiling are thoroughly insulated.

The lighting is designed to provide light for safe and nontiring kitchen and laundry work. The fixtures and installation conform to the recommended recipes for proper light conditioning in kitchen and laundry areas.

Those of us who are charged with the promotion and utilization of the "Easy Does It" Kitchen are finding the idea to be a challenging project and one that has a powerful appeal to all classes of customers. We feel that it is going to be one of the most effective public relations ventures with which we have had the privilege of working.

Four of 15 Safety Merit Award Recipients Attain 2,000,000 Accident-Free Man-Hours

OF the 15 EEI Safety Merit Awards presented during the October 15-December 31 period to companies which worked 1,000,000 or more man-hours without a lost-time accident, four awards mark the achievement of at least 2,000,000 man-hour records.

The award recipients in this period worked a total of 21,053,418 accident-free man-hours, bringing the man-hours recognized since the award was instituted in 1942 to 317,669,981.

The four awards which represent 2,000,000 man-hours or more were made to Consolidated Edison Co. of New York, Inc., Distribution Operation—Service; Georgia Power Co., Atlanta Division Meter Section and Atlanta Division Appliance Repair Section; and Ohio Power Co., Eastern Division.

Two of the awards, those to Consolidated Edison and Ohio Power, represent a continuation of accident-free records for which previous recognition has been made for the first 1,000,000 man-hours. The Consolidated Edison record extends from December 13, 1952, through December 21, 1953. The Ohio Power figure was amassed during the period from April, 1951, to October, 1953.

Both of the Georgia Power awards for a minimum of 2,000,000 man-hours represent first recognition for outstanding safety records. The Atlanta Division Meter Section worked from December, 1931, to October, 1953, to achieve its record. The man-hour total for the Atlanta Division Appliance Repair Section was accumulated between February, 1929, and May, 1950.

Even though award eligibility requirements for 1,000,000 man-hour recognition were completed a number of years ago by both Georgia Power sections, these records were filed with the Institute for the first time in December, 1953. There is no time limit on making applications for records providing all other conditions are fulfilled.

Awards issued during the October 15-December 31 period are:

Alabama Power Co.	
Eastern Division	1,000,000
The Cleveland Electric Illuminating Co.	
Entire Company	1,588,000
Central Power & Light Co.	
Entire Company	1,083,130
Consolidated Edison Co. of New York, Inc.	
Distribution Operation—Service	2,000,000
Georgia Power Co.	
Plant Atkinson	1,148,333
Atlanta Division Meter Section	2,117,545
Atlanta Division Underground Section	1,383,211
Atlanta Division Substation Operating Section	1,752,335
Atlanta Division Appliance Repair Section	3,336,341
Gulf States Utilities Co.	
Entire Company	1,066,798
Monongahela Power Co.	
System Operating Section of Operations Department	1,535,475
Ohio Power Co.	
Eastern Division	2,000,000
Public Service Electric & Gas Co.	
Meter Department—Camden Area	1,000,325
Trenton Area — Electric Distribution	1,000,200
Southern California Edison Co.	
Substation Division	1,041,725

Study of 56 Gas and Electric Company Annual Reports to Stockholders for 1952

A summarization of a project report of the joint EEI-AGA Subcommittees on Financial Reporting, under co-chairmanship of R. J. Plourde, The Detroit Edison Co., and F. J. Labanca, New Orleans Public Service Inc.

THIS is the fourth year that the General Accounting Committees of the Edison Electric Institute and the American Gas Association have sponsored a study of current industry practices in reporting financial and statistical information to stockholders. The analysis of the 1952 annual reports, covering 56 companies representing a cross section of the electric and gas industry, was made by the joint Subcommittees on Financial Reporting. Altogether, there were 11 electric companies, 22 gas companies, and 23 combination companies, the latter being predominantly electric. The current report now covers four years beginning with 1949.

Attractive and Colorful

Almost without exception these annual reports for 1952 were attractive and colorful and indicated careful preparation. They were well illustrated with pictures, charts, and statistical tables, probably to attract the attention of the security analysts as well as the stockholder in these days of heavy financing.

It is interesting to note that in 1952 there was reflected in the balance sheets of three companies included in the survey their investments in common stock of Electric Energy, Inc. This company, located at Joppa, Ill., was organized by five business-managed electric companies to install more than 900,000 kw of generating capacity to serve the Atomic Energy Commission's uranium plant. Similarly, 15 utilities have banded together to organize the Ohio Valley Electric Corp. for the purpose of constructing two huge generating plants, totaling 2,200,000 kw, one in Ohio and the other in Indiana, to provide power for the atomic energy center under construction near Portsmouth, Ohio. Six of the 15 companies were included in the survey.

Another item of interest was the substantial increase in the number of companies which disclosed some reference to current or contemplated amortization of emergency facilities in their annual reports.

As in past years, the annual report of each of the 56 companies was analyzed in order to compare the terminology used to describe accounts and transactions and to determine the manner in which financial and statistical data were presented. In general, the data compiled from the 1952 study were presented in tabular form, ranking the preferred terminology as to usage and showing comparable data for the years 1951, 1950, and 1949. As stated in prior years, this report does not purport to set forth any particular form of presentation or terminology as preferable except to the extent that its most frequent usage may imply. It should be of value to persons responsible for preparing annual reports to see how other companies may have handled their particular problem.

The Certified Balance Sheet

All 56 utilities presented the conventional type of balance sheet with assets on one side and liabilities on the other, although there were a few reports where the assets and liabilities were printed on the same page instead of facing pages. Two companies had an unusual arrangement showing in comparative columnar form the balance sheets of each subsidiary which added across to a total or consolidated balance sheet. None of the companies deducted liabilities from assets to show stockholders' equity as some industrial companies are doing. While the caption, "balance sheet," is still the favorite, it appears to be giving ground to such captions as "financial position" or "financial condition."

Balance sheets become considerably more informative if compared with the preceding year. Evidently most utilities think so because the two-year comparison jumped from 42 to 50 this year, with only three companies showing one year. Three companies showed more than two years. Centless accounting has arrived with respect to the certified financial statements in annual reports. Only one company reported dollars and cents in 1952, while three companies went to the other extreme and reported in thousands of dollars.

The Plant Figure

We found that 44 companies gave some breakdown of the plant figure, an increase of six over last year. The remaining 12 showed only total plant. The basis of valuation of the plant accounts was disclosed by 54 companies, up seven over last year. Deductions of the depreciation reserve from plant was reported by 25 companies as against 21 last year. In many cases this undoubtedly resulted from the requirement by the Securities and Exchange Commission that those companies subject to the Holding Company Act must report their financial statements to stockholders in the form prescribed for SEC reports.

However, this could not be determined conclusively for all 25 companies. The switch may have been made by some companies to avoid placing in their stockholders' hands two different financial statements for the same period through release of an annual report and also a prospectus covering a security offering. There was no set pattern followed in setting forth plant detail, and the breakdown was custom-made to fit the needs of the individual companies.

In most of the annual reports investments followed the plant accounts on the asset side of the balance sheet. Two of three companies owning stock in Electric Energy,

Inc., and three of the six companies participating in the Ohio Valley Electric Corp. classified their holdings under investments. The remaining interests were classified elsewhere under various captions.

Under current assets a single caption for accounts receivable—net of reserve is becoming increasingly popular, but the trend is downward in showing the amount of the reserve. More companies reported prepayments in 1952 under current assets. The term, "other current assets," is disappearing from the balance sheet. The trend is up in detailing deferred debits.

Capitalization Section

The practice of locating the capitalization section as the first item on the liability side of the sheet and including therein both equity and debt capital continues to grow. This classification was followed by 44 companies in 1952, whereas there were 39 in 1951. Twelve companies continued to show surplus and/or capital stock at the bottom of the balance sheet. While the term surplus is still popular, it is steadily losing ground to various expressions of retained income. The number of companies adopting the latter term increased from seven in 1949 to 16 in 1952.

Heavy financing in the last few years has, of course, been reflected in the balance sheet. The number of companies reporting preferred stock is now up to 46, but only a little over half reported the authorized and outstanding number of shares. About three-fourths of the companies reported the number of authorized and outstanding common stock shares in their balance sheets with the remaining companies showing such information in a supporting schedule or note. For the first time we note that over half the companies are showing the details of their long-term debt in schedules apart from the balance sheet, which has greatly improved its appearance. The most popular caption is "long-term debt" excluding current maturities, with reference to a page or schedule for details.

Under "current liabilities" we found "current maturities of long-term debt" heading the list. This was followed by "notes payable or other obligations" reported by 34 companies in 1952 as against 21 in 1949.

A single amount for accounts payable was reported by 53 companies. Thirty-two companies reported a dividend liability at the year-end. Customers' deposits were reported by 42 companies, over half of which reported them immediately following the dividend liability. Accrued taxes were shown in a single sub-caption and amount by 40 companies. The remaining companies broke out the income tax liability. Lumping the interest liability into a single sub-caption and amount was preferred by 48 companies in 1952 as against 38 last year. Other current liabilities were totaled into one figure under various sub-captions by 44 companies. The trend was up in detailing deferred credits. This was due probably to the increase in unamortized premium on debt and customers' advances for construction. Contributions in aid of construction was generally a captioned item standing alone.

In last year's report reference was made to the fact that the American Institute of Accounts has been advocating a limitation of the use of the term "reserve" to mean a reservation of surplus, indicating an amount of unidentified or unsegregated assets held or retained for a specific purpose. Utility accountants may be aware of this fact, but we noted that most companies set forth their reserves for depreciation, depletion, amortization, injuries and damages, insurance, contingencies and other purposes under the caption "reserves."

Certified Income Statement

The conventional type of statement, with revenues, expenses, other income, and income deductions listed in that order, was followed with only slight variations by 50 companies in 1952. Only eight companies showed a combined income and surplus statement. Only one company provided an income statement for only one year, the preferred reporting being a two-year comparison, with four companies showing three or more years. Penny reporting was ignored by 55 companies. Earnings per share were reported at the conclusion of the income statement by eight companies, one more than a year ago.

Segregating revenues by departments was the choice of 41 companies, while five companies went further by showing class of service or type of customer, the same as last year. Ten companies used a single caption to cover all revenues.

Operating Revenue Productions

In the reporting of operating revenue deductions, 36 companies covered all operating expenses in a single caption and amount, or a single caption for expenses plus an additional caption for the cost of purchased electricity and/or gas. This left 20 companies which reported in greater detail. From examination of the reports, it is apparent that the utilities preferred to set forth the major elements of expense such as labor and fuel elsewhere in their reports, particularly in a condensed statement of operations. Maintenance was set forth by 49 companies and depreciation and amortization by all the companies. All but one company broke down their taxes to show Federal income taxes separately. Several companies reported in some detail on other classes of taxes. Reference to excess profits tax was made by 34 companies.

The accounting for income tax reductions arising from special amortization of emergency facilities greatly increased in importance in 1952 as compared with 1951. In the 1952 annual reports of 21 companies there was some reference to current or contemplated amortization as compared with two in 1951. In the case of nine of the 21 companies the amount of Federal income tax being deferred was shown in the tax section of the income statement, with a corresponding credit being reflected in the earned surplus statement. Eight of the nine companies made specific reference to a restriction upon such earned surplus resulting from such amortization.

Of the remaining 12 companies, two reflected the credit in a "reserve for deferred income taxes" on the balance sheet. Two more companies showed Federal income taxes in total in the income statement, with footnotes to disclose the amount of tax reduction resulting from amortization of emergency facilities. In

the text of its annual report another company declared it was taking credit for this amortization, but there was no indication in the income statement that such tax reduction was taken. Another company reported that it had been granted necessity certificates and that the tax reduction attributable thereto was inconsequential in 1952.

Either in the footnotes or in the text, six companies made reference to the existence of possible amortization in their annual reports which stated in effect that the companies had reached no decision to exercise such benefit or that amortization was not reflected in the financial statements. Undoubtedly, some companies have deferred decision pending action by the Federal Power Commission in prescribing the accounting for this amortization.

With respect to income deductions, there is an apparent trend by the reporting companies to lump all deductions together except for interest on debt, amortization of debt discount (premium), and expense and interest charged to construction—credit.

Certified Surplus Statement

Reference has already been made to the fact that the term "surplus," though still popular, is steadily losing ground to various expressions of retained income or income retained in the business.

In spite of the fact that both the Securities and Exchange Commission and public accountants usually frown upon the practice of passing a wide variety of items of relatively small amounts through the earned surplus account instead of income, it is still general practice in the utility industry, though the trend is downward.

Earned surplus restrictions were reported by 38 companies either in notes to the financial statements or in the balance sheet or surplus statement.

Notes to the Financial Statements

As in the case of previous studies of the 56 annual reports, it was found again that the notes to the financial statements varied so widely that any year-to-year comparison was difficult. However, it was possible to make a comparison by broad categories of information to which the notes referred.

It was interesting to observe that several explanations set forth in the notes in 1951 were not repeated in 1952 even though it was evident that the same conditions existed. Six companies did not present any formal notes. The remaining 50 companies set forth an aggregate of 301 notes in 1952, about the same as in 1951 but over 100 less than in 1950. For 1952, 97 notes pertained to securities, 47 to contingent liabilities and pending litigation, 41 to plant investment, 40 to depreciation, 28 to income taxes, 11 to pensions, and the balance totaling 37 to numerous other items. Many of the notes made it possible to report cleaner, streamlined financial statements through the inclusion of supplemental statements of, for example, long-term debt details.

Condensed Statement of Operations

This sort of informal statement to supplement the certified income statement was used by 38 companies in 1952, an increase of one over last year. In most cases the presentation took the form of a listing of revenues and income from all sources, followed by the use for which revenue was paid out or set aside, including that which was retained in the business. Twenty-eight of the companies used the phrase "retained" (or "used") in the business. Summary of operations was the most popular title with two years the favorite comparison. About a third reported the amount of change from the previous year. Here we found labor, including some employee benefits, set forth as a separate item.

Generally the terminology used in these statements was somewhat less technical than that found in the formal income statement. In a few statements each of the terms used was accompanied by an explanation set forth in italics or small boldfaced type which helped to clarify its meaning. In most of the annual reports the summary of operations was located well up in front, whereas in all cases but one the formal financial statements were located at the back of the annual report.

There were 26 companies which used income dollar charts to show the use to which they put their revenues. Most of them showed the breakdown of the current year's revenue dollar in cents per item of major expenses, or percentages of total revenues. In many reports variations of the customary pie chart were used.

Statistics

As in the past studies, statistical information appearing in the annual reports of the 56 companies was classified into four categories. Gas and electric statistics only were analyzed, minor services being ignored. Information reported for 1952 was almost equally divided between two- and ten-year periods. Most of the statistical tables were located at the back of the reports.

The categories relating to electric and gas operating statistics were the most frequently presented. Considering that 34 companies furnished electric service either alone or in combination with gas, we found that kilowatthour sales were reported by 31 companies, the number of customers (29), annual kilowatthour sales per residence customer (23), peak load (23), output, rated generating capacity and annual revenue per kilowatthour for residential service (17 each), and the number of employees (11). Here the ten-year period was the most popular. Total reporting of electric operating statistics was up over last year.

Gas Operating Statistics

With respect to gas operating statistics, we noted that 45 companies furnished gas service either alone or in combination with electric utilities. Here we noted that the number of customers were reported by 31 companies, m.c.f. sales (27), miles of pipeline (24), number of employees (16), total output and available supply (15), horsepower capacity of compressor stations (11), peak load (ten), and daily capacity (eight). Here the two-year period was the most popular. Aggregate reporting of statistics relating to gas operations was down over last year.

Next in importance were statistics relating to the income statement.

Twenty-four companies reported comparative condensed income statements covering from two- to ten-year periods. In addition, gross operating revenues were reported by 39 companies, revenues by class of service (36), earnings per share (20), net income (15), net income retained in the business (13), and dividends per share (ten). Except for the condensed income statements, the two-year period was the most popular. Aggregate statistics in this category were up over last year.

Balance sheet statistics were the least frequently shown of any of the classes in this section of the study. Companies reporting total plant investment totaled 20, plant additions (11), net plant additions (ten), and plant additions, retirements, and net increase (ten). Other statistics related to common stock outstanding (16), number of stockholders (14), long-term debt (13), depreciation reserve (ten), and total capitalization (eight). Statistics in this classification also showed an increase over last year.

Miscellaneous Tabulations

This section of the study covered the miscellaneous charts and tabulations which are usually found scattered throughout the texts of most annual reports. Separate listings of charts and tabulations were made and classified as to subject matter. Of the 272 charts accounted for in 1952, it was possible to classify 260 into 16 general types of information such as operating revenues, unit sales, plant and construction, customers, generating capacities, expenses and taxes, stockholders, payrolls, etc. Tabulations aggregated 123, of which 107 were classified into 15 areas of subject matter similar to that covered in the charts.

Each year the total number of classified charts presented by the reporting companies has increased, whereas the classified tabulations have decreased. This well-defined trend stems, we believe, from the fact that charts allow the presentation of more types of information and more elaborate variations in a condensed form. For example, in 1952 charts of units sales and operating expenses increased eight, while tabulations decreased seven; charts on plant and construction increased four, tabulations decreased three; charts on capitalization increased two, tabulations decreased five.

Wealth of Data

When we compare the wealth of data presented in the utility annual reports of today with the rather brief reports of a few years ago, we must conclude that utility managements have had to accede to the demands of the security analyst and the regulatory authority. Furthermore, there appear to be some inherent dangers in the use of new accounting terminology to make the certified statements more understandable to the layman; thus utility accountants have resorted to the use of the somewhat more expressive nontechnical terms in condensed statements, statistics, tabulations, and charts to explain the year's happenings. Many of the figures used in these areas are reconcilable to the formal statements but not necessarily so.

At any rate, the average stockholder, per se, must find the going difficult if he attempts to wade through the entire contents of today's annual report. Some utilities have cut back on their annual reports, preferring to publish special reports for those interested in financial data.

Two Spring Campaigns for Promoting Electric Ranges and Electric Water Heaters Announced

TWO new campaigns for promoting electric ranges and electric water heaters on a coordinated industry-wide basis in the spring of 1954 have been announced by the EEI Residential Promotion Committee.

These are the first of five promotions planned for 1954 in which it is expected that all branches of the electrical industry will participate to gain the benefits of concentrated promotional activity during designated months. Electric companies, manufacturers, distributors, dealers, and electrical leagues have all indicated interest in tying-in with the range and water heater programs during the months of March, April, and May. These months were chosen as a result of a survey conducted last year to set up a coordinated appliance-promotion calendar for the industry.

The major effort in the range promotion will be concentrated in the month of April. Using "Spring Showing" as the theme and incorporating an adaptation of the new industry slogan "Be Modern—Live Electrically," the committee has prepared three special promotional items—a colorful window display, a consumer folder, and a gift bond blank to be used by dealers in obtaining prospects for range sales. With these three items serving as a nucleus, it is expected that electric companies, dealers, distributors, and manufacturers will develop their own promotions using local ads and other materials already available throughout the industry. Samples of the special materials have been mailed to industry groups along with a "Plan for Action" that outlines the steps that the various branches may take to tie-in to make the program most effective.

For the water heater program, the month chosen for the greatest concentration of effort is May. The theme, "Get Rid of Your Old Fashioned Water Heater," was selected and is featured in the display material especially prepared for the promotion. In addition to the display kit, a consumer folder stressing the eight reasons why electric water heaters are best has been produced.

Other Available Materials

The Institute also has available for electric water heater promotions a movie, a set of slides, two booklets, and a radio spot transcription, all of which can be easily incorporated into any local or national campaign. By using these materials and locally produced items, electric companies, dealers, distributors, and leagues will be able to prepare a complete promotional campaign for electric water heaters. Samples of the special water heater materials and a suggested "Plan for Action" for all branches of the industry have been mailed.

EEI PUBLICATIONS AND SERVICE MATERIAL

(Prices include transportation in U. S. only. Please order by number shown before title. Standing Orders may be placed for a specified number of copies of reports of various committees as issued, to be shipped to one address.)

Payable in United States Currency—Postage Stamps Not Acceptable

Accounting, Purchasing and Stores, and Statistical

	Members	Non-Members
Accounting Conference Proceedings (Bound Volume) 1953	$6.00	$6.00
Previous Years	3.00	3.00
Internal Auditing Procedure Manual.	6.00	7.00
51-23—Methods of Estimating Utility Plant Life, 1951	1.50	3.75
Financing Utility Capital Requirements, 1949	1.00	1.00
"Elgas Co.—Simulated Federal Income Tax Return," 1947	1.00	1.00
Simulated Federal Income Tax Return, 1947	1.00	1.00
Customer Accounting Practices and Policies, 1946	1.00	1.00
Summary of Definitions, Covering Depreciation and Related Terms, 1939	1.00	1.15

Statistical

53-2—Electric Light and Power Industry, 1952 (1953)	.40	1.00
52-2—Electric Light and Power Industry, 1951 (1952)	.40	1.00
51-2—Electric Light and Power Industry, 1950 (1951)	.30	.75
50-2—Electric Light and Power Industry, 1949 (1950)	.30	.75
R-2—Electric Light and Power Industry, 1948 (1949)	.30	.75
Q-2—Electric Light and Power Industry 1947 (1948)	.30	.75
O-2—Electric Light and Power Industry, 1945 (1946)	.30	.75
M-2—Electric Light and Power Industry, 1944 (1945)	.30.	.85
(Statistical Bulletins also available for years 1932 to 1943 inclusive) each.	.30	.75
Weekly, Monthly and Annual Statistics (Includes Annual Statistical Bulletin; Weekly Electrical Power Output; Monthly Electrical Research Statistics)	2.00	2.00

Engineering Committees

ACCIDENT PREVENTION—RESUSCITATION

51-8—"By the Grace of God," 1951	.25	.25
100-499 copies	15% discount	
500 or more copies	25% discount	
P-9—Application and Care of Rubber Protective Equipment, 1948	.25	.25
100-499 copies	15% discount	
500 or more copies	25% discount	
O-15—Use and Care of Pole Climbing Equipment, 1946	.25	.25
M-10—Fifteen Messages on Accident Prevention in Electric Utilities	.10	.10
L-4—Linemen Cutouts (2/45)	.10	
K-8—Pole Top Resuscitation (9/43)	.10	
(Quantity Prices on Application)		

ELECTRICAL EQUIPMENT COMMITTEE

50-7—Specifications for Alternating Current Power Circuit Breakers (2nd Edition) AEIC—1950	.60	.60
M-15—Recommended Safety Practices for Electrical Metermen		
Single copies	.25	
10 to 49 copies	.20	
50 to 99 copies	.18	
100 or more copies	.15	
M-3—Principles of System Relaying (1945)	.60	1.50
F-13—Reconditioning Flood Damaged Electrical Equipment (12/38)	.30	.75

HYDRAULIC POWER COMMITTEE

53-1—Standards for Distribution Transformers, Overhead Type—5th Report, 1953	1.00	1.00
52-14—Pitting Experiences of Hydraulic Turbines	.60	1.50
D-15—Penstocks (12/35)	1.00	2.50

JOINT REPORTS

51-19—Joint Use of Poles in Rural Areas, EEI-Bell Systems, 1951	No charge
51-16—Inductive Coordination Aspects of Power Factor Correction Capacitor Installations — Engineering Report No. 50 — Joint Subcommittee on Development & Research — EEI and Bell Telephone System—1951	.80 2.00
51-3—Recommended Standards for Distribution Transformers, Conventional Subway Type—1st Report, EEI-NEMA, 1951	.60 .60
R-9—Branch Circuit Overcurrent Protection for Low-Voltage Circuits of 30 Amperes or Less Used for Interior Wiring—Report of Joint Committee on Branch Circuit Protection of AEIC & EEI, 1949	1.00 1.00
R-6—Preferred Voltage Ratings for A-C Systems & Equipment, EEI-NEMA (1949)	.70 .90
Q-8—Single - Phase Motor Starting Current Rules, EEI-NEMA-AEIC, 1948	.25 .25
Q-4—Guide for Specification on Indoor Metalclad Switchgear, AEIC-EEI-NEMA, 1948	.25 .25
Q-3 — Standards for Distribution Transformers (Fourth Report), EEI-NEMA, 1948	.80 1.00
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J-4—Low Frequency Shielding in Telephone Cables—Engineering Report No. 48—Joint Subcommittee on Development and Research (5/42)	.80 2.00
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I-8—Susceptiveness of Subscriber Station Sets—Engineering Report No. 46—Joint Subcommittee on Development and Research (12/41)	.60 1.50
I-7—Frequency Weighting for Message Circuit Noise — Engineering Report No. 45—Joint Subcommittee on Development and Research (12/41)	.20 .50
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H-8—Standard Basic Impulse Installation Levels — AIEE-EEI-NEMA (1/41)	.05 .05
H-3—Inductive Coordination Aspects of Petersen Coil Grounding—Engr. Report No. 42—Joint Subcommittee on Development and Research (12/40)	.25 .65
F-17—Short - Circuiting Relay Protectors—Engr. Report No. 41—Joint Subcommittee on Development and Research (8/38)	.40 1.00

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TD-8—Suggestions for Specifications for Straight Tinned Copper Connectors 1940	.10	.10
TD-9—Specifications for Single Tube Seamless Copper Splicing Sleeves 1942	.10	.10
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TD-11—Specifications for Guy Hooks and Guy Strain Plates, 1951	.10	.10
TD-12—Specifications for Pole Guards, 1946	.10	.10
TD-13—Specifications for Guy Thimbles, 1950	.10	.10
TD-15—Specifications for Pole and Lower Steps, 1946	.10	.10
TD-16—Line Hardware Materials Inspection Procedure, 1950	.10	.10
TD-17—Specifications for Bolt Type Steel Insulator Pins with One Inch Diameter Lead Threads, 1947....	.10	.10
TDJ-19—Standard Mounting Bracket for Distribution Cutouts and Distribution Lightning Arresters, 1949	.10	.10
TD-21—Specifications for Steel Clevises for Guy Strain Insulators, 1952	.10	.10
TD-22—Specifications for Pole Top Pins, 1951	.10	.10
TD-23—Specifications for Guy Clamps, 1951	.10	.10
TD-51—Specifications for Low and Medium Voltage Pin Type Lime-Glass Insulators 1942	.25	.25
TDJ-52—Standards for Wet-Process Porcelain Insulators — Suspension Type, EEI-NEMA, 1952	.25	.25
TDJ-53—Standards for Wet-Process Porcelain Insulators — Spool Type, EEI-NEMA, 1952	.25	.25
TDJ-54—Standards for Wet-Process Porcelain Insulators — Strain Type, EEI-NEMA, 1952	.25	.25
TDJ-55—Standards for Wet-Process Porcelain Insulators—Low-and-Medium Voltage Pin Type, EEI-NEMA, 1952	.25	.25
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53-14—Practical Farm Wiring Demonstrations, 1953 .....1 to 49 copies .50 Quantity prices upon request.		
Farm Electrification Speakers' Slide Kit on Electrical Safety and Maintenance on the Farm—57 Kodachrome slides and speakers' script—single kits		12.00
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51-11—Farm Electrification Research, 1951	1.00	1.00
50-8—Farm Electrical Equipment Handbook, 1950. Single copy 2.25 postpaid. Quantity prices upon request.		
Farm Electrification Manual—Includes 17 Sections	6.00	9.50
Quantity prices and prices of individual sections upon request.		
General		
53-5—Study to Determine the Load and Revenue Potential of Apparel Stores, 1953	.50	.50
52-11—Application of Electrical Equipment in Commercial Establishments, 1952	1.00	2.50
Quantity prices upon request.		
51-22—Electric Range Installation Manual, 1951	.50	.50
51-21—Electric Laundry Equipment Installation Manual, 1951.....	.35	.35
51-15—Study to Determine Load and Revenue Potential of American Food Markets, 1951	.25	.25
51-12—Study to Determine Load and Revenue of Water Heater Market, 1951	.25	.25
R-19—Catalogue of Sales Aids for Electric Industry, 1949.....	1.00	2.00
P-6—The Heat Pump (7/47).....	.25	.25
Lighting		
53-9—Bonus Bulb Promotion, 1953...	.25	.25
52-9—Electric Signs—the Merchants' Best Advertising Medium, 1952...	.25	.25
52-8—Home Lighting Story of Company X, 1952.....	.30	.30
R-18—Tabulation of Information Relating to Street Lighting As Obtained from Returns of 104 Public Utility Companies, Throughout the U. S., 1949	.40	.40
Power		
I-1—Power Sales Manual—Volumes I and II, includes two binders and tabs. Prices available upon request.		

NATIONAL PROGRAMS

Better Light Better Sight Bureau

"Teaching About Light and Sight"—Classroom program for teaching about light and sight in 5th and 6th grades. Price list on request.

"Living With Light" — Classroom program for teaching about light and sight in Junior High School Science classes. Price list on request.

"Lighting for Better Living"—Program for teaching about light and sight in Home Economics classes, 4-H Clubs and Extension Groups. Price list on request.

"Light Is What You Make It"—A sound movie in Technicolor produced by Walt Disney Productions, 16 mm, 10 min. Price schedule on request.

"See for Yourself" — Home lighting, sound-slide film, 15 mins. 105 frames 30.00

"Educating in a Truer Light"—School Lighting, sound-slide color film, 22 min. over 100 frames 50.00

Accompanying booklet .....5.00 per 100

Planned Lighting Program

Series of mailers and booklets promoting planned lighting for stores, schools, offices, industries and homes. Price list upon request.

Sales Training Program

Three Courses Available—Residential, Commercial and Rural Prices upon request.

Appliance Sales Training Course—6 Films and Records..... 250.00

Set of 6 Salesmen's Manuals for above course 4.50

Industrial Sales Training Handbook.. 18.50

Residential Lighting Film & Record. 30.00

Residential Lighting Salesmen's Manual .75

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OTHER PROMOTIONAL MATERIALS

*Minimum Order

	Members	Non-Members
Commercial Cooking		
"Your Answer to Commercial Cooking".....	.75	
Quantity Prices Upon Request.		
"Penny Folder"—"Invest One Cent in Electricity"	4.50 per 100	
Data Sheets 2.00 first set, .75 each for next 14 sets. .25 each additional set if sent to one address.		
Electric Water Systems Council		
"Case of the Missing Heart".....16.00 per 1000*		
Electrical Living		
EM-2 "Dreams Come True When You Live Electrically" .....5.00 per 100*		
Home Service		
EM-5 "Electric Roaster" ..... 9.00 per 100*		
"Carefree Cooking Electrically" ....14.00 per 100*		
R-14 "Patterns for Parties" .....10.00 per 100*		
EM-3 "Open the Door to Modern Home-making Education" ..... 7.00 per 100		
Water Heating		
EM-4 "Go Electric When You Need Hot Water" ..... 4.00 per 100*		
Wiring Booklets—Quantity Prices Upon Request.		
M-8 "Handbook of Farmstead Wiring Design"	.40	.40
M-7 "Handbook of Residential Wiring Design"	.25	.25

Miscellaneous Publications

*Quantity prices upon request.

53-17—14th Electric Power Survey Report, 1953	.75	.75
53-13—"I Want to Know About the Electric Industry," 1953-1954 2 to 99 copies 25¢ each*		
53-12—EEI Pocketbook of Electric Industry Statistics, 1953...Single copies 35¢ each*		
53-6—Area Development Suggestions, #3, 1953	.30	.75
53-4—Bibliography of Heat Pump, Through 1951	1.00	1.00
52-17—Area Development Suggestions, Number 2	.15	.40
52-12—Area Development Suggestions #1, 1952	.40	1.00
52-3—Report of the Industrial Development Subcommittee of EEI Rural & Urban Development Committee, 1952	.50	1.25
52-A—Report of Recreation & Travel Development Subcommittee of EEI Rural & Urban Development Committee, 1952	.25	.65
52-B—Report of Civic Development Subcommittee of EEI Rural & Urban Development Committee, 1952.	.25	.65
51-18—Specifications for Impregnated Paper Insulated Cable, High Pressure Pipe Type—1st Edition, AEIC, 1951 .....Single Copy 1.00*		
51-4—Specifications for Impregnated-Paper Insulated Lead-Covered Cable Oil-Filled Type, AEIC, 1951..Single copy 1.00*		
50-7—Specifications for Alternating-Current Power Circuit Breakers (2nd Edition), AEIC, 1950.....	.60	.60
50-6—Principles for Sound Water Resources Development, 1950..21.00 per thousand 3.00 per hundred		
R-17—Specifications for Impregnated Paper-Insulated, Lead-Covered Cable, "Solid" Type (8th Edition) AEIC, 1949	1.00	1.00
R-12—Electrical Meterman's Handbook —6th Edition—1950 Single copy 3.30		4.90*
Q-11—Suggested Field Test Procedure for Determination of Coefficient of Performance Factor of an Electric Heat Pump While Operating on Heating Cycle, 1948	.25	.25
Q-5—Specifications for Impregnated Paper-Insulated, Lead-Covered Cable, "Low Pressure, Gas-Filled" Type—AEIC, 1948 .....Single copies 1.00 10 or more copies .85		
Rate Book for 1953 .....20.00		30.00
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(Includes Annual Statistical Bulletin: Weekly Electric Power Output; Monthly Electrical Research Statistics)		

Periodicals

Better Light Better Sight News (6 issues yearly)	1.00	1.00
Edison Electric Institute Bulletin (Monthly)	2.00	2.00
Farm Electrification (a bi-monthly publication) Up to 10 copies	Free	
Over 10 copies.....	.75	1.00
Quantity prices upon request.		
Home Service Exchange Yearly subscription	1.00	1.50
One free copy to members upon request.		

Personals

Allen S. King, Executive Vice President, Northern States Power Co. (Minn.), has been elected President and Director, succeeding the late **Bernard F. Braheney.**

Mr. King, who first worked with the company during summers dating back to 1916, is a 1922 graduate of Massachusetts Institute of Technology. Starting as an engineer with Northern States Power upon graduation, he worked in many departments of the company before becoming manager of three North Dakota divisions at Minot, Grand Forks, and Fargo. He was named executive vice president in 1951.

Concurrently, **L. F. Chambers,** Vice President-Treasurer, was designated as the principal finance officer of the company. He has been with Northern States Power for 41 years, having served in the Accounting Department and as treasurer.

Joseph A. Busch, Assistant to the Vice President in Charge of Sales, Northern States Power Co., has been appointed Vice President to succeed the late **Walter E. Olson.**

Mr. Busch, who started with the company in its Sales Department in 1932, has worked in various divisions of the company, becoming manager of municipal sales in 1948 and assistant to the vice president in 1950.

Mr. Olson was with Northern States Power for 12 years, first as assistant to the president and later as vice president. Before joining NSP he was, for six years, secretary-manager of the North Central Electric Association. Prior to entering the electric power field he was active in Chamber of Commerce work in cities throughout Minnesota. He was an active member of several civic and trade groups.

Paul D. Austin has been appointed Vice President in Charge of Sales for Northern States Power. A graduate of the University of Minnesota in 1921, he joined the company that same year and later advanced to the position of manager of suburban sales. Following some experience in municipal and industrial sales in various divisions of the service area, Mr. Austin became manager of the municipal sales department in 1950.

Gordon W. Evans, Vice President and General Manager of Kansas Gas & Electric Co., has been elected President to succeed **Murray F. Gill,** who will continue as Chairman of the Board of Directors.

Mr. Evans served with Public Service Co. of Oklahoma and Oklahoma Power & Water Co. before becoming president of Missouri Edison Co. and the East Missouri Power Co. He joined Kansas Gas & Electric in 1947 as assistant to the president, became vice president during the same year, and was named vice president and general manager in 1949.

Mr. Gill became associated with the company in 1937. After serving as vice president, he was named president and general manager in 1940 and became chairman of the board in 1949.

O. Titus, President of Pennsylvania Electric Co., has received additional executive responsibilities through his election to the presidency of Metropolitan Edison Co. Both companies are part of the General Public Utilities integrated electric system. He succeeds **Wilbur H. Doran,** killed recently in an automobile accident.

Mr. Titus was graduated from Phillips Exeter Academy and Yale University, where he majored in engineering. Following two years of army service in World War I, during which he rose to the rank of captain, he became a cadet engineer with Rochester Gas & Electric Co. in 1919. Joining New York State Electric & Gas Corp. in 1930, he served successively as assistant purchasing agent, purchasing agent, manager of the Lancaster District, vice president in charge of the Western Division and later the Central Division, and executive vice president. In 1941 he joined Metropolitan Edison, which he served as president until 1951, when he was elected president of Pennsylvania Electric. From 1941 to 1943 he also served New Jersey Power & Light Co. as president.

John W. Sheehey, Vice President, Green Mountain Power Corp., has been elected President of the company, succeeding **Ralph N. Hill.**

Mr. Sheehey started his electric industry career in 1905 as plant superintendent of the St. Albans Public Electric Co. In 1917 he was made superintendent of Burlington Light & Power Co., remaining there until 1930 when he was made operating manager of Green Mountain Power. He served in that capacity until becoming vice president in 1940.

Mr. Hill, who has been elected Chairman of the Board, served as vice president and general manager of Green Mountain Power for ten years before becoming president in 1940. Prior to joining the Vermont company he worked with Western Electric Co., in Chicago and New York, as an engineer.

Executive changes at New England Electric System have been announced following the establishment of Essex County Electric Co. at Salem, Mass., and Suburban Electric Co. at Malden, Mass.

Newell A. Clark, President of Malden Electric Co., has been named President of both Essex County Electric and Suburban Electric. The latter company was formed by the merger of Suburban Gas & Electric Co. and Malden Electric Co. Mr. Clark has been with NEES since 1921, holding several executive positions before moving to Malden. In 1952 he was elected president of Lowell Electric Light Corp., Haverhill Electric Co., and Amesbury Electric Co., and vice president of Lawrence Gas & Electric Co., all NEES subsidiaries.

H. Sherman Holcomb has been named a Vice President of Essex County Electric, which was established to take over Salem Electric Lighting Co., Gloucester Electric Co., and Beverly Gas & Electric Co. He had served the latter companies as vice president since 1952. Mr. Holcomb has been with New England Electric System since 1936.

John T. Costello, Manager of Gloucester Electric Co., has been appointed a Vice President of Essex County Electric, and **Oliver T. Pulsifer,** Manager of Malden Electric Co., has been made a Vice President of Suburban Electric Co.

R. N. Beniamin, Vice President, Stone & Webster Service Corp., has been elected President, succeeding

George H. Clifford, who has been elected Chairman of the Board.

A graduate of Harvard College and the Harvard Graduate School of Business Administration, Mr. Benjamin has been employed by Stone & Webster and its affiliates in corporate and financial work since 1927. In 1937 he became associated with Engineers Public Service Co., Inc., the mutual service company of the Engineers Public Service Co. holding company system, and was named secretary of most of the companies of that system and head of its Corporation Department. He joined Stone & Webster Service Corp. in 1947, becoming vice president in 1948. Mr. Benjamin has been a member of the EEI Financing and Investor Relations Committee since 1951 and is presently serving as its chairman.

Mr. Clifford has been affiliated with Stone & Webster interests since 1901. He became the first president of the service corporation in 1929.

Gould W. Van Derzee, President, Wisconsin Electric Power Co., has been elected President of the Association of Edison Illuminating Companies, succeeding **Justin R. Whiting,** Chairman of the Board of Consumers Power Co. Mr. Van Derzee was formerly a vice president of the association.

The new AEIC president has been with Wisconsin Electric Power and a predecessor company since 1913. President of the company since 1945, he previously served as assistant general manager, vice president and assistant general manager, and vice president and general manager. He is also president of several Wisconsin Electric Power subsidiaries, including Wisconsin Michigan Power Co., Wisconsin Natural Gas Co., and Milwaukee Electric Railway & Transport Co.

Mr. Van Derzee is a past president of the Wisconsin Utilities Association and a member of the EEI Board of Directors.

Elections of officers of the New Jersey Utilities Association have been announced as follows:

Charles M. Hagan, Executive Vice President and Director of Atlantic City Electric Co., has been elected President of the group, succeeding **Herbert E. Cliff,** General Commercial Manager of Public Service Electric and Gas Co.

Wilson S. Meyers, Public Relations Director, Atlantic City Electric Co., will continue as Secretary until his three-year term expires in 1935.

Mr. Hagan started with Atlantic City Electric in 1928 as a power engineer. In 1930 he was made district superintendent in Paulsboro, being named division manager for the Salem area in 1940 and assistant general manager in 1946. He was elected a director in 1947, a vice president in 1949, and executive vice president in 1952.

Edward Porter, Vice President in Charge of Finance and Accounting, Philadelphia Electric Co., has been named Senior Vice President, and **A. S. Corson,** Comptroller, has been elected to succeed Mr. Porter as Vice President.

A native Philadelphian, Mr. Porter joined Philadelphia Electric in 1928 as comptroller, having been transferred from The United Gas Improvement Co., where he served as general auditor. In 1929 he became vice president and comptroller and in 1943 was placed in charge of finance and accounting.

Mr. Corson, also a native of Philadelphia, served The United Gas Improvement Co. as vice president prior to joining Philadelphia Electric as comptroller in 1949. He is active in various industry and accounting organizations, including EEI, American Gas Association, Controllers Institute, Pennsylvania Gas Association, and Pennsylvania Electric Association.

Claude A. Mulligan, Assistant to the President of Consumers Power Co., has been named to the post of Vice President of the company. Following engineering studies at McGill University, he joined Consumers Power in 1926. Mr. Mulligan served as assistant to the Battle Creek division manager for 16 years and as division manager for three years, prior to 1952, when he was made assistant to the president.

Eugene L. Hough, Chief Engineer, Union Electric Co. of Missouri, has been elected Vice President and reappointed Chief Engineer, a position he has held since 1951.

Before joining Union Electric Co. in 1928 as an electrical engineer, Mr. Hough, a 1922 graduate of the University of North Dakota, spent six years with General Electric Co. He was appointed chief design engineer in 1943 and since becoming chief engineer has been in charge of all the company's engineering and construction work.

Lee Poe, Manager of the Southern Division, Arizona Public Service Co., has been elected a Vice President of the company. He has been Southern Division Manager since last April.

Mr. Poe's utility experience includes employment by Florida Power & Light as an electrical engineer and 12 years of work on power projects in Mexico and South America as well as in this country. In 1941 he joined Central Arizona Light and Power Co., a Public Service predecessor, which he served successively as head of the Electric Distribution Section and manager of Phoenix District Operations.

He is a native of Webster, Fla., and a graduate of Georgia School of Technology.

Arthur C. Barschdorf has been appointed Director of Public Information of Minnesota Power & Light Co. After attending Williams College, Mr. Barschdorf had several years of publicity and advertising experience before entering military service. Prior to joining Minnesota Power & Light, he was employed for seven years on the Hammond, Ind., *Times*, and in 1952 received the Neiman Fellowship for journalism, which enabled him to spend a year of study at Harvard University.

R. B. Donworth, Betterment Engineer in the Power Stations Department of Duquesne Light Co., has been made Manager of Atomic Power Development. Mr. Donworth, who received an A.B. degree from Yale University in 1919 and a B.S. degree from Massachusetts Institute of Technology two years later, joined Duquesne Light in 1930. He is a member of ASME and the Engineers Society of Western Pennsylvania.

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(Terms Expiring 1954)

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D. E. WASHBURN.....Boston Edison Co., Boston, Mass.

(Terms Expiring 1955)

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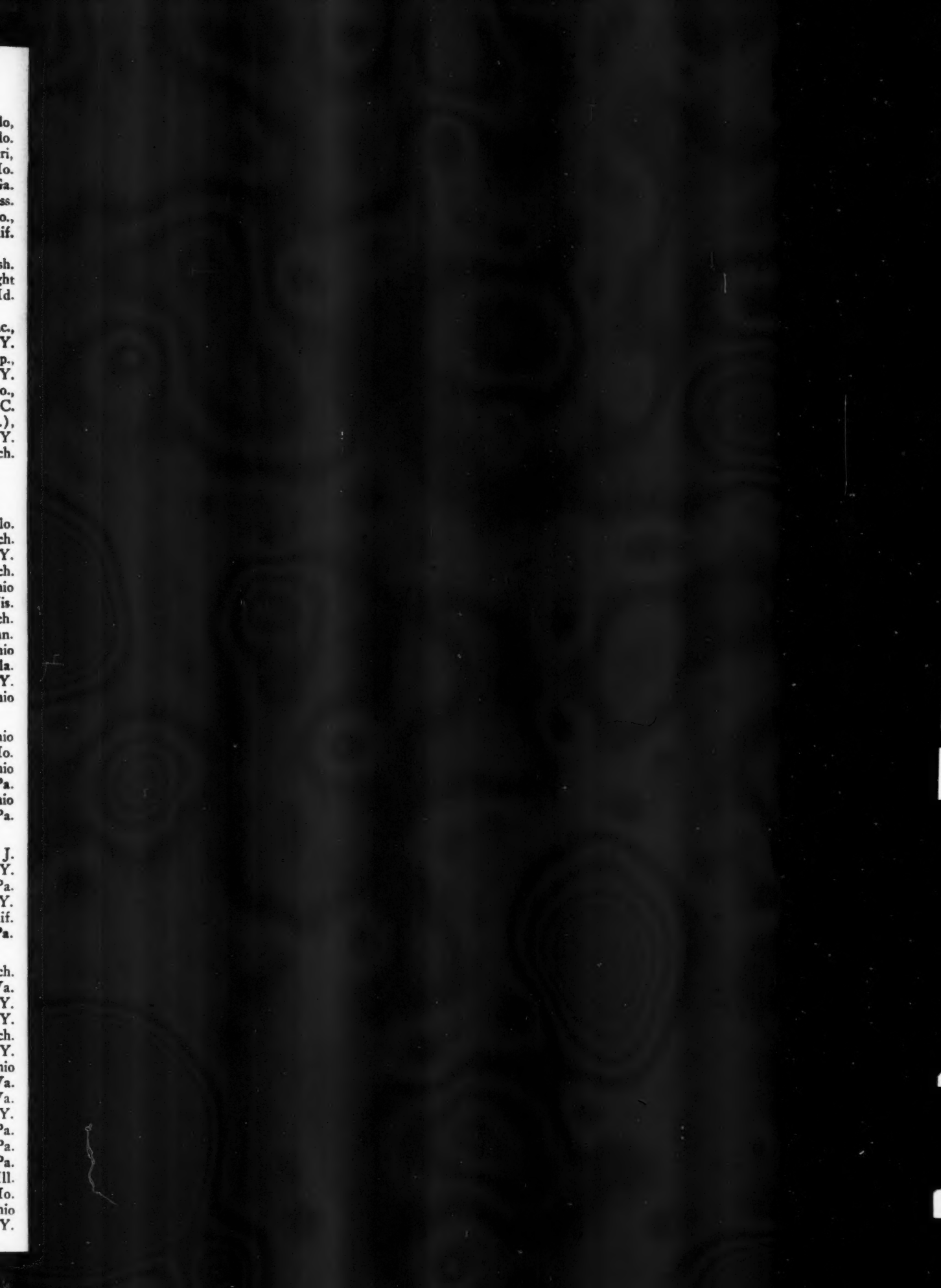
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